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REVISION OF *VERBENA* SER. *TRICESIMAE* (VERBENACEAE)

GUY L. NESOM
2925 Hartwood Drive
Fort Worth, TX 76109, USA
www.guynesom.com

ABSTRACT

Twelve species of *Verbena* sect. *Verbena* series *Tricesimae* are treated: *V. calinfera*, *V. canescens* (type of the series), *V. falcata*, *V. gracilis*, *V. hirtella*, *V. johnstonii*, *V. livermorensis*, *V. moranii*, *V. perennis*, *V. pinetorum*, *V. subuligera*, and *V. xylopoda*. *Verbena neomexicana*, which has been considered central in this group, also is included in the treatment (for a total of 13 species) but in its strict sense may be more closely related to species of ser. *Verbena*. Four new species are described from northern Mexico and the adjacent USA: **V. livermorensis** Turner & Nesom, sp. nov. (Texas, Coahuila), **V. calinfera** Nesom, sp. nov. (Baja California), **V. moranii** Nesom, sp. nov. (Baja California), and **V. falcata** Nesom, sp. nov. (Nuevo León). Two new combinations are made: **V. hirtella** (Perry) Nesom, comb. nov. (Texas, Chihuahua, Coahuila), based on *V. neomexicana* var. *hirtella* Perry, and **V. xylopoda** (Perry) Nesom, comb. nov. (Arizona, New Mexico, Chihuahua, Sonora), based on *V. neomexicana* var. *xylopoda* Perry. *Verbena pinetorum* occurs primarily in Chihuahua and Sonora and is confirmed as a member of the Arizona flora. *Verbena neomexicana* Small (vs. *V. neomexicana* [A. Gray] Small) is the correct name for that species, which occurs mostly in southwestern New Mexico, extending to adjacent Arizona and Chihuahua. An overview of the group includes a key with descriptions and typifications. Photos (types) of the four new species are provided and a detailed distribution map is provided for each of the 13 species.
KEY WORDS: *Verbena neomexicana*, taxonomy, new species, Verbenaceae

Among the most significant taxonomic problems in North American *Verbena* are patterns of variation and nomenclature in *V. neomexicana* Small and taxa that been considered its close relatives. An adjustment in this group was made in the recognition of the Mexican *V. perennis* var. *johnstonii* Moldenke at specific rank (Nesom 1992). This species group is considered as a whole in the present study, which has been undertaken toward accuracy of the forthcoming FNANM treatment, since some of its members occur on both sides of the USA-Mexico border.

The group has often been informally referred to as the *Verbena neomexicana* group—it was described as sect. *Verbena* ser. *Tricesimae* Nesom (Nesom 2010a), with *V. canescens* Kunth as the type and including *V. neomexicana*. Remarkably, however, the present study indicates that strictly defined *V. neomexicana* may be more closely related to species of sect. *Verbena* ser. *Verbena* than to any of those treated here. Plants of ser. *Tricesimae* generally have glossy-surfaced leaves that usually are elongate and pinnatifid to deeply toothed (but varying to subentire) and that have impressed venation adaxially and revolute margins, slender, usually solitary or few-branched spikes with remote fruits, glandular rachises and calyces, distinctly exserted corolla tubes, and nutlets with commissural faces not reaching the apex. *Verbena neomexicana* has distinctly thinner leaflets and fruits with commissural faces that extend completely to the nutlet tips (see further comments under the species).

Perry (1933) recognized three varieties within *Verbena neomexicana*: var. *neomexicana* (typified by a collection from southwestern New Mexico and restricted in concept by her to only that area), var. *hirtella* Perry (the type from trans-Pecos Texas), and var. *xylopoda* Perry (the type from southern Arizona). Kearney and Peebles (1960) noted that *V. neomexicana* in Arizona is represented chiefly by var. *xylopoda*; they also recognized the occurrence of a similar species, *V. pinetorum*

Moldenke (the type from Chihuahua), in two southern counties. Shreve and Wiggins (1964) and Wiggins (1980) recognized both var. *xylopoda* and var. *hirtella* in the areas of their floristic coverage, but not *V. pinetorum*. All three varieties of *V. neomexicana* are included in recent accounts of the New Mexico flora (Martin & Hutchins 1980; Allred 2009).

O'Leary et al. (2010) have recognized two varieties within *Verbena neomexicana*, treating var. *xylopoda* as a synonym of the typical expression. They also treated the primarily south Texas endemic *V. runyonii* Moldenke (a distinct species of ser. *Plicatae* Nesom, fide Nesom 2010a and others) as a synonym of var. *hirtella* and *V. pinetorum* (a distinct species, as treated here) as a probable synonym of var. *neomexicana*. In their view, *V. russellii* Moldenke from Sinaloa, Mexico, also is a synonym of *V. neomexicana* but it is regarded by Nesom (2010b) as typical *V. officinalis*.

Verbema neomexicana was not unambiguously defined in Barber's phenetic study of the *Verbena stricta* complex (1982)—measurements were broadly variable and synonyms were not included, as she "adopted names and circumscriptions … to reflect the prevailing consensus." Annotations of specimens at SMU and TEX indicate that she considered the species to include var. *hirtella* and var. *xylopoda*. Citation of the Edwards Plateau of Texas in Barber's statement of overall geographic range of *V. neomexicana* was based on misidentifications of *V. canescens*, which was not a species among those in her study.

The majority of identifications of plants of the *Verbena neomexicana* group have placed them as one or another variety of *V. neomexicana*. With the accumulation of collections from northern states of Mexico, especially in the last thirty years, it has become possible to better discern patterns of variation among these plants—pointing to more discrete geographical patterns and the existence of more species than previously recognized.

Specimen citations are provided here for the four newly described *Verbena* species and, in clarification of their identities, for *V. hirtella*, *V. johnstonii*, *V. neomexicana* sensu stricto, *V. pinetorum*, *V. subuligera*, and *V. xylopoda*. Identifications of *V. canescens*, *V. gracilis*, and *V. perennis* have generally not been problematic and specimen citations are not included for these, except to document new or interesting distributions within the species.

KEY TO THE SPECIES

1. Proximal and midcauline leaves linear, usually unlobed, margins not toothed.

    2. Stems eglandular, otherwise glabrous or glabrate to sparsely hispidulous, hispid-strigose, or hirsute-strigose ..... **Verbena perennis**
    2. Stems sessile- to stipitate-glandular, otherwise sparsely but conspicuously hispid to hispidulous-scabrous or densely hispidulous-hirtellous.

1. Proximal and midcauline leaves pinnatifid or margins deeply toothed to regularly coarsely crenate to serrate.

    3. Leaves not lobed or deeply toothed, margins regularly coarsely crenate to serrate.
        4. California and Baja California. ..... **Verbena moranii**
        4. Texas, Chihuahua, and Coahuila.

            5. Stems sparsely hirsute-pilose, bristly-hirsute, or bristly-pilose, eglandular to very sparsely stipitate-glandular; leaves evenly distributed along the stems; corolla limbs 4–6 mm in diam. ..... **Verbena livermorensis**

5. Stems densely hirsutulous to hirtellous and minutely stipitate-glandular; leaves often clustered at base; corolla limbs (5–)6–9 mm in diam. ..... **Verbena hirtella**

3. Leaves pinnatifid to deeply toothed, sometimes 3-lobed

6. Stems prostrate to decumbent-ascending or ascending; midstem leaves mostly 0.5–1.5 cm long ..... **Verbena gracilis**
6. Stems erect to erect-ascending; midstem leaves mostly 2–5.5 cm long.

7. Floral bracts spreading at right angles, distinctly longer than the calyces ..... **Verbena subuligera**
7. Floral bracts ascending-erect, usually shorter or equalling the calyces.

8. Leaf teeth or lobes usually antrorsely angled, not recurved; New Mexico, Arizona, Chihuahua, Sonora.

9. Stems sparsely to moderately hirsute-villous to bristly-hirsute, eglandular; corolla limbs (5–)6–9 mm in diam. ..... **Verbena pinetorum**
9. Stems moderately hirsute to densely hispidulous, sparsely to very sparsely minutely stipitate-glandular, becoming densely stipitate-glandular distally into inflorescence; corolla limbs 3–5(–6) mm in diam.

10. Stems loosely hirsute; leaves evenly distributed, basal and lower cauline not persistent; spikes from medial to distal branches; corolla tubes 2.5–4 mm, limbs 1.5–2.5 mm in diam.; nutlets with commissural faces reaching tip **Verbena neomexicana**
10. Stems hispidulous to hirsutulous; leaves largest and often persistent basally and proximally; spikes from proximal to medial branches; corolla tubes 4–5 mm, limbs 4–7(–8) mm in diam.; nutlets with commissural faces not reaching tip ..... **Verbena xylopoda**

8. Leaf teeth or lobes spreading at nearly right angles and usually slightly recurved; Texas, Coahuila, Nuevo León, Zacatecas.

11. Leaves evenly distributed and relatively even-sized, surfaces conspicuously shiny, margins mostly non-revolute; stems eglandular to very sparsely stipitate-glandular ..... **Verbena falcata**
11. Leaves most basal and lower cauline, much reduced in size above, surfaces dull, margins strongly revolute; stems densely stipitate-glandular.

12. Leaves oblanceolate to elliptic-oblanceolate, oblong-oblanceolate, or narrowly oblanceolate in outline, midstem blades 2–7(–10, –15) mm wide, margins coarsely serrate to pinnately lobed with 1–5(–7) pairs of teeth or lobes ... **Verbena canescens**
12. Leaves mostly linear to linear-oblong, midstem blades 1–2 mm wide, proximal cauline with 1–2 pairs of linear lobes or unlobed and the margins entire ..... **Verbena johnstonii**

1. VERBENA CALINFERA Nesom, sp. nov. **Fig. 1, Map 1. TYPE: Mexico. Baja California.** El Pedregoso, 29° 32' N, 114° 33' W, occasional in disturbed soil at roadside, 730 m, 19 Apr 1975, *Moran 21749* (holotype: LL!; isotype: ARIZ!).

Verbenae hirtellae vestimento caulino et foliis non lobatis similis sed differt ramificatione inferiore, foliis latioribus regione petiolari distincta, floribus minoribus, lobis calycis triangularibus

patento-erectis, bracteis floralibus ovatis nonciliatis, et spicis fructificantibus relative compactis remanentibus.

Perennial herbs, short-lived, from a woody taproot and caudex. **Stems** erect to ascending-erect, 1–6 from the base, 20–35 cm, branching mostly in the proximal half, densely hirsutulous with short non-glandular hairs of uneven length, moderately stipitate-glandular. **Leaves** mostly obovate to subspatulate in outline, tapering slightly to a petiolar region, proximal and midstem 20–35 x 6–12 mm, basal mostly deciduous by flowering, cauline persistent, margins coarsely serrate with 1–4 teeth per side, sometimes slightly 3-lobed, veins slightly impressed adaxially. **Fruiting spikes** mostly solitary, from branches at midstem or lower, elongating but remaining relatively compact with fruits slightly overlapping or more open, 6–20(–25) cm; rachis with vestiture like cauline; floral bracts ovate-acuminate, 3–4.5 mm, usually as long as the calyx or slightly shorter, hirsute to hirsutulous, stipitate-glandular. **Calyces** 3.5–4 mm, hirsute and hirsutulous, stipitate-glandular, lobes triangular to narrowly triangular, erect to spreading-recurving, not connivent. **Corollas** light blue to deep blue, tubes 3.5–4.5 mm, 1–1.5 mm longer than the calyx, limbs 4–6 mm in diam. **Nutlets** 2–2.5 mm, commissural faces not reaching the apex, densely white-papillate or papillate distally and elongate-bullate proximally.

Additional collections examined. **Mexico. Baja California**. 3 mi W of San Agustin, wash bottom, 1900 ft, 17 Apr 1949, *Dressler 648* (MO); Cuesta de Jarahuái and vicinity, Laguna Seca, *Idria-Franseria* association with volcanic rock, 2400-3000 ft, 6 Apr 1950, *Gentry & Cech 8998* (ARIZ) and *9013* (ARIZ); 9 road mi SE of El Progresso, 29° 55' N, 115° 05' W, occasional on gravelly flat, 575 m, 25 Mar 1970, *Moran 16893* (ARIZ); S side of San Matías Pass, 31° 18.5' N, 116° 35' W, rocky N slope, scarce, 1050 m, 15 Sep 1977, *Moran 24805* (LL, plus 4 duplicates); Big Cañon of Tantillas Mts., 10 Sep 1875, *Palmer 312* (MO, NY; also F and GH, fide Perry, who IDed it as var. *xylopoda*); El Marmol [29°58' 0" N, 114°49' 0" W], locally abundant in disturbed soils and most depressions along main road and in washes, Apr 1967, *Stephenson s.n.* (MO); Laguna Seca, ca. 15 mi SE of Catavina (as measured along the road) on road to Laguna Chapala, rocky channel leading into a dry lake, ca. 2700 ft, 16 Oct 1959, *Thomas 8185* (ARIZ).

A collection of *Verbena calinfera* from the vicinity of El Marmol was alluded to by Shreve and Wiggins (1964) as the basis for the occurrence of *V. neomexicana* var. *hirtella* in Baja California. Similarly, Wiggins (1980) noted that var. *hirtella* in Baja California ranged from the Río Colorado delta south to the vicinity of El Marmol. *Verbena calinfera* is similar to *V. hirtella* in densely hirtellous stem vestiture and non-lobed leaves but different in its low branching, leaves broader in outline and with a distinct petiolar region, smaller flowers, triangular spreading-erect calyx lobes, broadly ovate floral bracts, and fruiting spikes that remain relatively compact. The two taxa are long-disjunct, with the closest points in their ranges separated by more than 400 miles.

2. VERBENA CANESCENS Kunth, Nov. Gen. Sp. (quarto ed.) 2: 274, plate 136. 1818. **Map 2.**
TYPE: Mexico. [Guanajuato]. "Crescit in montibus Mexicanorum, prope Guanaxuato, Marsil et sodinam Belgrado," *Humboldt and Bonpland s.n.* (holotype: P fiche!).

Verbena roemeriana Scheele, Linnaea 21: 755. 1848. *Verbena canescens* var. *roemeriana* (Scheele) Perry, Ann. Missouri Bot. Gard. 20. 302. 1933. **NEOTYPE** (O'Leary et al. 2010, to be designated). The protologue cited **Texas**. [Comal Co.]: "Auf steinger Prairie bei Neubraunfels, [no date], *F. Römer s.n.*"

Verbena neei Moldenke, Phytologia 2: 241. 1947. Type: Argentina. De las Pampas de Buenos Ayres, [between 1789 and 1791], *L. Née iter 108* (holotype: MA, photo-NY!; isotype: NY! digital image!). O'Leary et al. (2010, fide Troncoso 1979) note that the type specimen of *Verbena neei* Moldenke from Argentina apparently represents *V. canescens* and probably is erroneously labeled. Moldenke (Phytologia 10: 98. 1964) recognized *V. neei* as a synonym of

V. canescens and at least it is clear that the plants are more similar to *V. canescens* than to any species known from South America.

Plants perennial (sometimes short-lived), taprooted. **Stems** branching from crown, (1–)3–10 from the base, erect to ascending-erect or decumbent-ascending, 15–35 cm, densely hirsutulous to hirsute-villous, minutely stipitate-glandular, less commonly sparsely stipitate-glandular to eglandular. **Leaves** mostly on proximal half of stems, persistent, oblanceolate to elliptic-oblanceolate, oblong-oblanceolate, or narrowly oblanceolate in outline, midstem blades 2–5(–6) cm x 2–7(–10, –15) mm, veins impressed adaxially, margins coarsely serrate to pinnately lobed with 1–5(–7) pairs of teeth or lobes, strongly revolute, hispid-hirsute and minutely stipitate-glandular; sessile to subpetiolate, distal commonly sessile and subclasping. **Spikes** 1 or 3(–5) from medial branches, elongate and loose or sometimes denser with overlapping fruits, 3–24 cm; floral bracts ovate-lanceolate, 4–8 mm, proximal longer than the calyces, sometimes slightly shorter. **Calyces** 2.1–3(–4) mm, hirtellous to hirsutulous, minutely stipitate-glandular, lobes deltate to narrowly lanceolate, erect, not connivent. **Corollas** blue to purple, tubes 2.5–4(–5) mm, 0.5–1(–1.5) longer than the calyces, limbs 2.5–4(–6) mm in diam. (not spreading). **Nutlets** 1.8–2 mm, easily separating; commissural faces ending below the nutlet tips, plates bullate to papillate, rarely smooth. $2n = 14$.

Flowering Mar–Jun(–Oct). Roadsides, disturbed sites, ledges, rocky and gravelly hills, flats, dry stream beds, mesquite scrub, acacia-leucophyllum scrub, spiny hackberry scrub, live oak woodland, oak-juniper woodland, limestone, calcareous soil, sand, caliche, sandy clay loam; 50–700 m; USA (New Mexico, Texas); Mexico (Aguascalientes, Coahuila, D.F., Durango, Guanajuato, Hidalgo, Mexico, Nayarit, Nuevo León, Oaxaca, Puebla, Querétaro, San Luis Potosí, Tamaulipas, Veracruz, Zacatecas).

Verbena canescens is identified from South America by O'Leary et al. (2010), who cite two SI collections from Colombia (Depto. Cundinamarca, in Feb and Mar of 1908). I have not seen these, but if the identifications are correct, it increases the plausibility that *V. neei* (see comments above) might actually have been collected in South America.

Some plants of *Verbena canescens* in eastern Coahuila, and some in Puebla, appear to have larger corollas than typical elsewhere over the range of the species (upper limits of variation in the description). They do not appear to be distinct in other features. See additional comments under *V. johnstonii*.

Verbena canescens has been attributed to Alabama, based on a report by Mohr (1901), who cited a collections from Mobile Co.: "Adventive from Mexico. … On ballast heaps." (US-"Herb. Geol. Survey"). Moldenke (1963) cited a collection from California (San Diego Co.: *E. Palmer 312*, NY) and from Nevada (Lincoln Co.: *M.E. Jones 554*, POM), but the species does not appear to be naturalized in either state.

The distribution of *Verbena canescens* reaches western outlyers in Culberson Co. and Reeves Co., Texas, but has not been documented for New Mexico, even though it seems likely to be in the southeastern corner of that state, perhaps in Chaves County. A record from San Miguel Co. cited by O'Leary et al. (2010) is based on a misidentification: *Hill & Levandoski12070* (NY!) instead is *Verbena plicata Greene*.

3. VERBENA FALCATA Nesom, **sp. nov. Fig. 2, Map 3.** **TYPE**: MEXICO. **TYPE**: **Mexico. Nuevo León**. Mpio. Galeana. Hwy to Potrero Prieto, wooded canyon, 1500 m, scattered plants, flrs blue, 11 Nov 2009, *Hinton et al. 28113* (holotype: MEXU; isotypes: HINTON-digital image!, TEX!, additional to be distributed).

Verbena pinetorum aspectu vestimento similis sed distinctus caulibus dense hirsutulis et foliis aequaliter distributis pinnatim dentatis divisionibus falcatis apicibus acutis, paginis conspicue nitidis, et marginibus plerumque non-revolutis.

Plants perennial herbs, thick-taprooted with caudex(?) becoming fibrous-rooted. **Stems** 1-several from the base, erect, 30–50 cm, densely hirsutulous, very sparsely stipitate-glandular to eglandular. **Leaves** evenly distributed along the stems, basal and lower cauline deciduous by flowering, ovate to lanceolate in outline, margins deeply toothed to pinnately lobed, the divisions spreading at nearly right angles and usually slightly recurved (falcate), midstem blades 2–5.5 cm x 6–20 mm, margins toothed with (2–)3–4 teeth or lobes per side, not revolute or only slightly so, veins impressed adaxially, hirsute-villous on both surfaces, eglandular to sparsely glandular, adaxial surfaces and epidermal coverings of abaxial veins conspicuously shiny; sessile or gradually attenuate basally to petiolar regions 3–10 mm. **Spikes** mostly solitary, 10–15 cm in fruit, elongate and loose; floral bracts triangular, shorter than the calyces. **Calyces** 2.5–3.5 mm, loosely hirsutulous, stipitate-glandular, lobes triangular, connivent. **Corollas** blue to pink, tubes 4–5.5 mm, 1.5–2 mm longer than the calyces, limbs 5–7 mm in diam. **Nutlets** 1.8–2 mm, easily separating at maturity, commissural faces not reaching nutlet apex, densely bullate.

Flowering Aug–Oct. Wooded canyons, bushy limestone hillsides, pine-oak with *Arctostaphylos*; 1250–1500 m; Mexico (Nuevo León).

Verbena falcata is distinctive in its densely hirsutulous stems and evenly distributed, pinnately toothed leaves with falcate divisions with acute apices, conspicuously shiny surfaces (hence the epithet), and mostly non-revolute margins. In its mostly solitary spikes, glandular calyces, and long-exserted corolla tubes, *V. falcata* is similar to others of the *V. neomexicana* group. Among these, it is generally similar in aspect to *V. pinetorum* of western Mexico, but the leaves of *V. falcata* are thicker and less dissected and the cauline vestiture is denser, shorter, and sparsely glandular to eglandular.

It is perhaps most likely that *Verbena falcata* is most closely related to *V. canescens*. *Verbena canescens* differs in its taller stems, leaves with revolute margins, dull surfaces, and shorter, more antrorsely directed teeth, the distal cauline leaves commonly sessile and subclasping, and in its corollas with shorter tubes and smaller limbs.

Additional collections examined. **Mexico. Nuevo León**. Mpio. Rayones, Galeana to Rayones +24 km, bushy limestone hillside, 1260 m, 17 Oct 1990, *Hinton et al. 20796* (TEX); 4 mi S of Galeana along Hwy 60, open pine forest, gypsum soil, 5370 ft, scattered along ravines, 5 Jul 1963, *McGregor et al. 98* (NY).

4. VERBENA GRACILIS Desf., Tabl. École Bot. ed. 3, 393. 1829. **Map 4**. **TYPE**: [probably **Mexico**]. Plant cultivated in the Botanical Garden of Paris (holotype: P, photo-MO!). O'Leary (2006) lectotypified *V. gracilis* Cham. (1836), a Brazilian species.

Verbena remota Benth., Pl. Hartw., 21. 1839. **TYPE. Mexico. Zacatecas** (fide K sheet) or **Aguascalientes** (fide GH and NY sheets), in arvis, 1839, *K.T. Hartweg 174* (holotype K; putative isotypes: GH, NY digital image!). "174. VERBENA (Euverbena) *remota*, sp. n., procumbens, pubescens, scaberrima, foliis inciso-pinnatifidus, laciniis cuneatis oblongisve subincisis acutiusculis, spicis terminalibus elongatis, floribus parvis remotis bractea lineari multo brevioribus."

Verbena arizonica A. Gray, Proc. Amer. Acad. Arts 19: 95. 1883. **TYPE: USA. Arizona.** [Cochise Co.]: Tanner's Canyon, near Fort Huachuca, 1882, *J.G. Lemmon 2858* (holotype: GH). Fide Perry (1933).

Plants perennial herbs, taprooted. **Stems** 1–3 from the base, often much-branched proximally, prostrate or ascending to decumbent-ascending or ascending-erect, 10–25 cm, hirsute with bristly hairs, minutely stipitate-glandular. **Leaves** ovate to ovate-lanceolate in outline, pinnately lobed or deeply toothed, basal and lower cauline persistent, midstem 5–15(–25) mm x 3–12 mm; petioles 1–3 mm. **Fruiting spikes** 1–3(–5) from proximal branches, fruits becoming remote proximally (lowermost sometimes axillary in uppermost cauline leaves) but usually remaining somewhat compact distally, 3–10(–15) cm; floral bracts linear-lanceolate to narrowly lanceolate, 3–5(–8 proximally) mm, longer than the calyces. **Calyces** 2–2.5 mm, hirsute and hispidulous, minutely stipitate-glandular at least near lobes, lobes deltate to deltate-apiculate, erect, not connivent. **Corollas** purplish to pink, tubes 3–3.5 mm, 0.5–1 mm longer than the calyx, limbs 2–2.5 mm in diam. **Nutlets** easily separating at maturity, 1.5–1.8 mm, commissural faces ending below the nutlet tips, bullate to low-papillate.

Flowering (Mar–)Apr–Sep. Rocky slopes, talus, canyon bottoms, grassy flats, road tracks; floodplains and terraces, lake edges, riparian woodlands, desert grassland, mesquite scrub, pine, pine-oak, oak, oak-juniper, oak-manzanita; 1000–1700(–2050 m; USA (Arizona, New Mexico, Texas); Mexico (Aguascalientes, Chihuahua, Distrito Federal, Durango, Guanajuato, Hidalgo, Jalisco, Mexico, Michoacan, Nayarit, Oaxaca, Puebla, Querétaro, San Luis Potosí, Sonora, Veracruz, Zacatecas).

Verbena gracilis is recognized by its low, branching habit, small and dissected leaves mostly on the proximal halves of the stems, long floral bracts, and small flowers and fruits. Like *V. canescens*, it has a wide distribution but its range lies mostly on the west side of *V. canescens* until they meet and become sympatric in southern Mexico. Stems of plants from central Mexico (including the type of *V. remota*) often are ascending-erect rather than prostrate to decumbent.

The only known record of *Verbena gracilis* from Texas is from Jeff Davis Co.: Davis Mts., Davis Mts. Resort, along Limpia Creek at Maguire Ranch ruins and resort HQ, 5700 ft, creek bottomland, 26 Jul 1986, *Worthington 14346* (NY). The collection is typical *V. gracilis*.

The record of *Verbena gracilis* for New Mexico is based on the report by McIntosh (1996), who documented the species from three localities in Hidalgo County (vouchers at NMC and SNM), and on the UNM collections cited here. The report by McIntosh of the species from Mora County, apparently far out of range, needs to be reexamined. **Hidalgo Co.**: Gray Ranch in the Animas Mts., 11 Aug 1990, *Ivey 21* (UNM); N end of Animas Mts, vicinity of Lower Indian Creek Canyon, rocky slopes, 5700 ft, 22 July 1975, *Wagner 1269* (UNM); Animas Valley, 4700 ft, 12 Sep 1975, *Wagner 1675* (UNM).

A putative record of *Verbena gracilis* from Utah is based on a citation by Perry (1933), who noted that "The specimen from Utah is atypical, but for practical purposes seems better referred here." [San Juan Co.]: Mesa E of Monticello, 25 Jul 1911, *Rydberg & Garrett 9201* (NY, as cited by Perry 1933). I was not able to find the specimen at NY and speculate that it has been reidentified as some other species. Utah is out of range for *V. gracilis* and the species has not been included in the Intermountain Flora (Cronquist 1984) or the Flora of Utah (Welsh et al. 2003), nor is it in the SEINet database or shown in the online Utah Atlas.

O'Leary et al. (2010) cite a collection of *Verbena gracilis* from Nuevo Leon, Mexico: Mpio. Derrumbadero, Cañon de los Capulines, above San Enrique, Hacienda San Jose de Raices, rare in meadows, 6 Aug 1935, *Mueller 2392* (MO, TEX). I annotated this as *V. gracilis* in 1992 but was mistaken then. The plants are single-stemmed and erect from the base, branching only about 5 cm above the base and the leaves have narrowly oblong midregions with triangular to lanceolate, slightly recurving lobes. They are similar in aspect to *V. falcata* but have long floral bracts much longer than

the calyces, which presumably influenced earlier identifications as *V. gracilis*. *Mueller 2392* is perhaps a hybrid but it clearly is not *V. gracilis*.

Records mapped for *Verbena gracilis* in Oaxaca are the following: Las Sedas, dry calcareous hills, 6000 ft, 11 Aug 1894, *Pringle 4784* (NY); near Mitla, Jun 1888, *Seler 22* (GH, as cited by Perry 1933); Las Sedas, Sep 1894, *Smith 221* (NY). The Smith collection is neary typical *V. gracilis*, but the Pringle collection has deeply toothed leaves and hirtellous stems suggesting genetic influence from *V. canescens*. Plants of both have prostrate stems radiating from the taproot.

5. VERBENA HIRTELLA (Perry) Nesom, **comb. et stat. nov. Map 5**. *Verbena neomexicana* var. *hirtella* Perry, Ann. Missouri Bot. Gard. 20: 298. 1933. **TYPE: USA. Texas**. Brewster Co.: dry arroyas and foothills of the Chisos Mts., 22 May 1928, *E.J. Palmer 34065* (holotype: MO!, digital image!; isotypes: GH-2 sheets, MO!, MO-digital image!, NY!, NY-digital image!).

Plants perennial, taprooted. **Stems** 2–8 from the base, erect, 15–60 cm, densely hirsutulous to hirtellous and minutely stipitate-glandular. **Leaves** often clustered at base, basal and lower cauline persistent, narrowly oblanceolate to oblanceolate or narrowly obovate, cauline similar to basal, blades 2–4 cm (basal) to 1.5–3 cm (midstem) x 6–10 cm, veins impressed adaxially, margins coarsely crenate to serrate with (2–)4–8 pairs of teeth, weakly revolute, densely hirsutulous to hirtellous and minutely stipitate-glandular; basally attenuate to subpetiolate. **Spikes** 1 or 2–3 from branches at midstem or below, elongate and slender, 8–15(–25) cm; floral bracts ovate-acuminate to ovate-lanceolate, 3–4 mm, shorter than the calyces. **Calyces** 3.5–4.5(–5) mm, densely hirsutulous to hirtellous and minutely stipitate-glandular, lobes deltate to triangular, erect, not connivent. **Corollas** blue to purple or lavender, tubes (3.5–)4.5–5.5 mm, 1–1.5(–2) mm longer than the calyx, limbs (5–)6–9 mm in diam. **Nutlets** 2–2.5 mm; commissural faces ending below the nutlet tips, with bullate plates. $2n = 14$.

Flowering Mar–Jun(–Nov). Rocky slopes, limestone flats, stream beds, sandy washes, roadsides, disturbed sites, grassy hills, riparian brush and woodland, *Acacia-Ungnadia-Celtis-Opuntia* scrub, mesquite brushland, sotol-agave, creosote bush; 1000–1800 m; N.Mex., Tex.; Mexico (Chihuahua, Coahuila).

The collections of *Verbena hirtella* from New Mexico appear to be disjunct from the larger range but the plants appears to be typical for the species. Localities in Val Verde Co., Texas, Durango, southern Coahuila, and Zacatecas appear to be outliers.

Verbena hirtella is morphologically and geographically discontinuous from *V. neomexicana*. They differ in vestiture, leaf morphology, corolla size, and nutlet morphology. *Verbena xylopoda* is more similar to *V. hirtella* in vestiture but these two are distinct by the contrasts below. I have seen no intermediates between *V. xylopoda* and *V. hirtella* in west-central Chihuahua, where they are sympatric.

1. Stems densely hirsutulous to hirtellous and stipitate-glandular; leaves unlobed, (basal and cauline) coarsely crenate to serrate with (2–)4–8 pairs of teeth; corolla limbs (5–)6–9 mm in diam. ..... **Verbena hirtella**

1. Stems moderately hirsute to densely hispidulous, sparsely to very sparsely stipitate-glandular; leaves (basal) crenate-serrate or coarsely toothed to deeply pinnately toothed or pinnatifid, cauline pinnatifid with (1–)2–3(–4) teeth or lobes per side, sometimes 3-lobed; corolla limbs 4–7(–8) mm in diam. ..... **Verbena xylopoda**

Additional specimens examined. **USA. New Mexico**. Sierra Co.: Elephant Butte Dam, open hillside, 3800 ft, 30 Apr 1933, *Nelson 2107* (UNM). **Socorro Co.**: hills just W of Socorro, along arroyo, 16 May 1953, *Castetter 5164* (UNM); 6 air mi W of Socorro on W side of Strawberry Peak, 6400 ft, rocky hillside with *Gutierrezia*, *Rhus*, *Atriplex*, *Opuntia*, *Yucca*, *Juniperus*, 26 Jul 1977, *Edwards & Repass 4730* (NY); rocky knoll in vicinity of Willow Springs just outside the SW corner of Bosque del Apache Refuge, 10 May 1949, *Fleetwood s.n.* (UNM); Sevilleta, road to the microwave tower, 7.35 mi from the north gate, S slope, 19 Apr 1989, *Maddux & Loftin 32* (UNM);
low mountains W of San Antonio, 14 Apr 1908, *Wooton 3852* (UNM). **Texas. Brewster Co.**: under cattle guard, ca. 2 mi. N of Tres Papalotes in the Solitario, on the Big Bend Ranch, 2 Jun 1975, *Butterwick & Strong 600* (TEX); vicinity of Tres Papalotes in the Solitario, on the Big Bend Ranch, 2 Jun 1975, *Butterwick & Strong 609* (TEX); ca. 1 mi. NW of Prospect Mt. and just E of Presidio/ Brewster County line, in the Solitario on the Big Bend Ranch, just E of stocktank, 5 Jun 1975, *Butterwick & Strong 724* (TEX); S side of Burro Mesa. Big Bend National Park, talus slope, drainage area, 23 Sep 1966, *Correll 33855* (LL); down the road from headquarters of the Blackgap Wildlife Management Area, 3 Jun 1969, *Grimes 309* (SMU); dry creek crossing on Terlingua-Chisos Mts road, just N of Chisos Mts, 3000 ft, 22 Aug 1947, *Hinckley 4004* (NY); ca. 10 mi. S of Marathon on road to Big Bend Park, roadside, 4000 ft, 20 Oct 1948, *Hinckley 4614* (NY, TEX); near Shafter, 10 Apr 1929, *Ingram 96342* (UNM); campground area, Inner Basin, Big Bend Natl Park, oak-pinyon-juniper, 2 Aug 1959, *Kruckeberg 4796* (NY); Big Bend Natl. Park, 13.8 mi E of the west entrance, 16 Apr 1960, *Lewis & Oliver 5457*, voucher for $n = 7$ (MO); Black Gap Wildlife Refuge, near entrance to Headquarters from Hwy 2627, rocky slope, sotol and agave abundant, 9 Jun 1969, *Mahler 13* (SMU); Chisos Mts., 1 Sep 1937, *Marsh 249* (TEX); Chisos Mts., gravelly mesa N of mts., 1065 m, 27 Jun 1931, *Moore & Steyermark 3277* (MO, NY); Chisos Mts., 1 Aug 1931, *Mueller 8138* (MO); Chisos Mts., 25 Aug 1931, *Mueller 8139* (MO, NY, TEX); Big Bend National Park, 3.5 km S of Panther Jct on Rio Grande Village Drive, gravelly roadside, 17 Mar 1986, *Reuter 287* (BRIT); Big Bend National Park, "Desert Tank", 7 mi. S of Cross Roads leading CCC Camp-Marathon-Hot Springs, 17 Jun 1941, *Rose-Innes & Moon 1200* (TEX); ca. 35 mi S of Black Gap Wildlife Management Area, SE of Marathon, limestone rocks of Brushy Canyon, Chihuahuan Desert vegetation, 20 Jun 1968, *Rowell 11635* (SMU, UNM); Oak Spring run-off area, dry stream bed, 3600 ft, 23 Aug 1970, *Semple 357* (MO); Big Bend National Park, Hannold Draw, mesquite brushland, frequent about disturbed places, 3039 ft, 8 Nov 2002, *Spjut & Marin 15080* (BRIT); Alpine, rocky hillside, 4600 ft, Apr 1932, *Steiger 1373* (NY); Chisos Mts., Wilson Ranch, 19 Jun 1931, *Tharp s.n.* (NY, TEX-2 sheets); Chisos Mountains foothills, 19 Jun 1931, *Tharp s.n.* (SMU); 71 mi. S of Alpine, calcareous soils, 3 Aug 1999, *Turner 99-10* (TEX); 0.2 miles along 2627 from hiway 385 (Big Bend ark road), limestone soils along roadside, 29 Sep 2003, *Turner & Dodson 23-283* (TEX); old lake bed at entrance of Big Bend State Park, 3 May 1937, *Warnock s.n.* (NY, TEX); Big Bend Park, 12 mi N of Hot Springs, along small sandy draw on alluvial fan, 20 Mar 1941, *Warnock 537* (NY, TEX); Buena Vista ca. 6 mi W of Alpine, 3 Apr 1937, *Warnock W168* (NY); Nichols Ranch, infrequent about level lands, 8 Aug 1937, *Warnock 20436* (TEX); Big Bend National Park, Terrapin Tank, near Lone Mt., 4000 ft, frequent on limestone flat, 2 Sep 1947, *Warnock & Hinckley 7040* (TEX); 7.1 mi by Hwy 118 N of the jct with Hwy 170 at Study Butte, roadside, creosote bush community, ca 3000 ft, 3 Apr 1983, *Worthington 9718* (NY, SMU); Chisos Mts., Nail Place, 12 Aug 1915, *Young 112* (MO, TEX). **Hudspeth Co.**: no locality data, 30 Jul 1943, *Tharp 43-804* (MO); ca. 7 mi WSW of Hot Wells, north peaks of Eagle Mts., sandstone mountainside leading up to conglomerate cliffs, 17 Jul 1943, *Waterfall 5143* (MO, NY). **Jeff Davis Co.**: Davis Mts., scenic drive S from Kent to HO Canyon, 22 Aug, 1949, *Tharp & Jansen 49-1144* (NY, TEX); 11 mi. N of Alpine, sparse along highway. igneous soil, 4550 ft, 18 Aug 1949, *Warnock 8885* (TEX). **Presidio Co.**: ca. 500–1000 ft NE of houses along road leading N from houses, at GPS point ± 17.3 ft., ca. 6 mi NW of jct US 90 and RM 2810 at Marfa, Hip-O Ranch Preserve, Marfa Quadrangle, occasional in impacted pasture area on fine textured tight soils in bottom of broad shallow draw between rocky igneous slopes, 4960 ft, 25Apr 2001, *Carr 19623* (TEX); N sides of E-W road parallel to and just N of RR track, 0.7

roadmiles E of main N-S road on Hip-O Ranch Preserve (TNC), just W of another ranch road (marked on topo) leading N, occasional in igneous-gravelly soil on S-facing gentle slope on low hill in grassy basin, 4830–4890 ft, 24 Aug 2001, *Carr 19955* (TEX); NW-facing rocky igneous slope and flat bench at top of slope, ca. 1–50 ft. above flat along E side of Big Trestle Draw, Hip-O Ranch Preserve (TNC), occasional in *Bouteloua curtipendula-B. gracilis* grassland dotted with *Rhus microphylla*, on NW-facing rocky igneous slope and flat bench at top of slope, 4930–4980 ft, 29 Aug 2001, *Carr 20014* (TEX); 16 mi. S of Marfa along roadside, gravel knoll; 19 Apr 1961, *Correll & Rollins 23652* (LL, NY, SMU); 18 mi N of Presidio on US 67, creosote bush, 2 Apr 1969, *Dunn 16070* (MO, NY); Marfa, 4 May 1932, *Garner 50* (TEX); ca. 38 mi SW of Marfa along Hwy 2819, middle portion of Pinto Canyon, 14 Apr 2004, *Gray & Turner 24-107* (TEX); Ruidosa, common, mountain sides, 13 Apr 1919, *Hanson 645* (NY); just E of Presidio, larrea-mesquite, limestone soil, 27 Mar 1972, *Higgins 5070* (NY); Marfa, Apr 1938, *Hinckley 1089* (ARIZ, NY, TEX-2 sheets); Marfa-Ruidosa road ca. 3 mi SW of Marfa, rocky hill, 4900 ft, 15 Aug 1940, *Hinckley 1254* (NY-2 sheets); slope E of Vieja Pass, 5100 ft, 16 Jul 1941, *Hinckley 1971* (NY, TEX); creek bank ca. ½ mi W of old Madrid (Madril) ranch north branch Arroyo Primero, ca. 3300 ft, 28 Mar 1942, *Hinckley 2428* (NY); Sierra Tierra Vieja, Clyde MacFarland ranch house, 4500 ft, 9 Jun 1943, *Hinckley 2709* (NY); near old Ross Mine, 22 Aug 1944, *Hinckley 3218* (NY); Capote Peak , 30 Aug 1944, *Hinckley 3246* (NY); along Oso Creek on the N side of the Chinati Mts. at Old Woods Ranch, 18 mi. NW of Shafter, 10 Nov 1946, *Hinckley & Warnock 46942* (NY, TEX); 0.5 mi SW of Solitario Peak, igneous hill, 4500 ft, 12 Oct 1958, *Johnston 3452* (TEX); Chinati Mtns. Natural Area. Pelillos Arroyo, a major drainage on the SW side of the Chinati Mtns., igneous boulders and alluvium at edge of arroyo. S-facing bank of arroyo, 3705 ft, Chihuahuan Desert scrub with *Acacia greggii*, *Yucca torreyi*, *Opuntia imbricata*, *Tecoma stans*, *Brickellia*, and *Guaiacum*, 21 Apr 2004, *Lott & Rankin 4952* (TEX); Chinati Mtns. State Natural Area, Pelillos Canyon, above the dam, riparian area with *Juglans*, *Salix* spp., *Cephalanthus*, *Tecoma*, *Fraxinus*, and *Quercus grisea*, in shade of boulders along streambed, 3840 ft, 22 Apr 2004, *Lott & Rankin 4989* (TEX); Chinati Mtns. State Natural Area, Cinco de Mayo Canyon, parallel and to W of San Antonio Canyon, slopes of wide canyon trending N-S, with *Viguiera stenoloba*, *Tecoma stans*, *Opuntia imbricata*, *O. engelmannii*, *Celtis pallida*, *Mimosa*, *Acacia greggii*, *Justica*, and *Heteropogon*, in large gravel-small boulders of old roadbed, 4133 ft, 6 Aug 2004, *Lott et al. 5163* (TEX-2 sheets); Chinati Mtns. State Natural Area. Pelillos Canyon, between the dam and Tinaja Prieta fork, canyon bottom woodland of *Salix*, *Juglans*, *Cephalanthus*, and *Quercus*, rare in gravel of canyon bottom, 3910 ft, 25 Mar 2005, *Lott et al. 5447* (TEX); Chinati Mtns State Natural Area, NE-SW trending tributary to San Antonio Canyon, below old San Antonio Mine, canyon scrub of *Acacia greggii*, *Ugnadia*, *Chilopsis*, *Celtis pallida*, *Opuntia imbricata*, and *Menodora*, 4370 ft, 21 Aug 2005, *Lott et al. 5569* (TEX); 28 mi. S of Marfa, off Hwy 67, rolling grasslands, 6 Aug 1945, *Lundell & Lundell 14340* (LL, NY, SMU); off Hwy 67, 6 mi N of Shafter, outlying hills of the Chinati Mts., [no date], *J.R. Lundell 5* (LL); 9 mi N of Shafter, 6 Jun 1977, *Van Devender s.n.* (ARIZ); Livingston Hills, 4 mi S of Shafter, limestone, 4200-4300 ft, 21 Apr 1975, *Van Devender s.n.* (ARIZ); Tierra Vieja Mts, Vieja Pass, SW of Valentine, limestone soil, 4200 ft, 7 Aug 1949, *Warnock 8908* (LL, SMU); along highway, 25 mi SW of Marfa toward Shafter, 4000 ft, 31 Feb 1957, *Warnock 14337* (LL); Bunton Flats, highway ca. 35 mi S of Marfa, frequent on limestone soil, 4500 ft, 27 Oct 1946, *Warnock 46615* (MO, NY, TEX); Bogel Ranch, 3 mi W of San Estaban Lake, grassland, sandy soil, 4100 ft, 28 May 1957, *Warnock & McBryde 14555* (LL). **Valverde Co.**: Del Rio, 950 ft, 19 Aug 1932, *Fisher s.n.* (NY). **MEXICO. Chihuahua**. Mpio. Chihuahua: 6 mi S of Cd. Chihuahua, roadside, 25 Jul 1967, *Alison & Moldenke 2105* (LL); microwave relay station, 21 km NW of Escalon, E of hwy to Jimenez, 26 57 N 104 35 W, 1650 m, rather steep hills of extrusive igneous rocks, *Larrea*, *Parthenium*, *Fouquieria*, *Lippia*, *Jatropha*, 7 Jul 1972, *Chiang et al. 8311A* (LL); 12 mi E of Parral, Rte 45, gravelly brush-covered plain, 6 May 1959, *Correll & Johnston 21528* (LL); 6 mi SE of Sacramento, Hwy 45, rocky open hilltop, 10 May 1959, *Correll & Johnston 21737* (LL, MO): Santo Domingo, mine, 3000 ft, 25 Jun 1977, *Dwyer 14189* (MO, NY); 18 mi N of Chihuahua City, 3 Aug 1965, *Flyr 507* (SMU); 15 mi NW of Escalon on Hwy

49, 30 mi S of Cd. Jimenez, roadside, open Chihuahuan desert with *Larrea*, *Acacia*, *Flourensia*, *Buddleia*, *Opuntia*, *Jatropha* and numerous annuals, 4500 ft, 24 Aug 1971, *Henrickson 5944* (LL); 39 rd mi NE of Aldama along Hwy 16 in limestone outcropping in open Chihuahuan desert, locally common on flats, to 1 ft high, with *Larrea*, *Flourensia*, *Fouquieria*, *Nama*, and grasses-annuals, etc, 4800 ft, 15 Sep 1972, *Henrickson 7617* (LL); Mpio. Chihuahua, 26 km S de Chihuahua, veg. Baja, desértica, 1600 m, 20-40 cm high, 6 Aug 1982, *Hernandez 8458* (TEX); Estacion Microondas "La Colorado" ca 38 km S of Jimenez on hwy to Torreon, 26 57 N 104 35 W, *Acacia-Bouteloua*, 31 Mar 1973, *Johnston et al. 10524* (LL); canyon in N face of Sierra Rica, S of Rancho La Consolacion, 1400-2000 m, steep slopes of igneous rocks, matorral, *Quercus*, *Ptelea*, *Garrya*, *Juglans*, *Sageretia*, 3 May 1973, *Johnston et al. 10773B* (LL); 8 mi W of Chihuahua, 5 Oct 1958, *Jones 23227* (TEX-2 sheets); Chihuahua, 3-4 Sep 1935, *LeSueur 53* (TEX), 16 Aug 1935, *LeSueur 231* (TEX); Rancho Experimental La Campana, carr. Chihuahua-Cd. Juarez, 1500 m, pastizal, Sep 1958, *Martinez M. 110* (TEX); N of Ricardo Flores Magón, 0.8 mi N of jct Hwy 10 on Hwy 195, at sharp bend in road, gravelly somewhat sandy colluvium, 1800 m, 28 Aug 1989, *Mayfield 77* (LL); 4.6 mi NE of Buenaventura, near KM 100, roadside with cholla, 5600 ft, 28 Aug 1967, *Oliver et al. 517* (MO); roadside wash at jct of Hwy 16 and road to Placer de Guadalupe, 7 Apr 1971, *Powell et al. 2063* (TEX); 11 mi NE of Lake Granero turnoff, Hwy 16, limestone rocky soil, 7 Apr 1973, *Powell et al. 2479* (LL); rocky hills near Chihuahua, 16 Apr 1885, *Pringle 270* (NY-3 sheets); Santa Eulalia Mts., 6225 ft, 19 Aug 1939, *Shreve 9097* (ARIZ); gravelly knolls along Chih Hwy 16, 35 mi S of Coyame, ocotillo, creosote bush, yucca, 24 Mar 1975, *Spellenberg 3984* (NY); 20 mi S of Chihuahua, calcareous desert, 9 Aug 1961, *Waterfall 16100* (SMU); 3 mi N of Cd. Juarez, road to Cd. Camargo, ca. 4500 ft, 1 Aug 1939, *White 2168* (ARIZ); N fork of the "Temporal" canyon, Benigno Mora Rancho, E slope of the Sierra de la Brena, ca 10 km W of Est. Mata Ortiz, 1900–2300 m, small creek canyon, *Quercus* spp, *Pinus* spp., *Pseudotsuga*, 29 Jul 1972, *Wilson & Johnston 8483* (LL); between Sacramento and Chihuahua, 24 Aug 1846, *Wislizenus 150* (MO); near San Pablo, 29 Apr 1847, *Wislizenus? 545* (MO); 5 km N Cd. Chihuahua, matorral, 6 Jun 1994, *Yen & Estrada 2616* (BRIT); 12 km N of Cd. Chihuahua, carretera libre Chihuahua-Juarez, *Mimosa aculeatocarpa*, 18 Aug 1996, *Yen & Estrada 5466* (BRIT); Mpio. Aldama, 3 km S Cd. Aldama, matorral y mezquital, 1450 m, 31 Aug 1996, *Yen & Estrada 5811* (BRIT); Mpio. Camargo, Rancho Mestenas, 20 km S de La Perla, matorral *Acacia-Mimosa*, pastizal *Bouteloua*, 1450 m, 20 Oct 1996, *Yen & Estrada 6740* (TEX); alrededores de Chihuahua, asociaciones de *Mimosa-Acacia*, 1490 m, 9 Mar 1997, *Yen & Estrada 6907* (BRIT); alrededores del poblado La Perla, 1490 m, matorral *Acacia-Larrea-Mimosa-Prosopis*, 21 May 1997, *Yen & Estrada 7128* (TEX); Mpio. Manuel Benavides, 5.6 km brecha Ojinaga-Manuel Benavides, *Larrea-Flourensia-Acacia*, 1250 m, 25 Jul 1997, *Yen & Estrada 7429* (BRIT); 26 km N de Chihuahua, carr. Chihuahua-Juarez, 1510 m, matorral *Acacia-Aloysia*, 27 Sep 1997, *Yen & Estrada 8805* (BRIT). **Coahuila**. Ca. 23 air mi NW of Las Delicias, in a valley of Sierra de las Delicias near old mine, rocky limestone NE-facing slopes, with *Acacia*, *Agave*, *Jatropha*, *Parthenium*, *Leucophyllum*, *Viguiera*, etc., 4800 ft, 29 Aug 1971, *Henrickson 6132* (TEX); 3 mi N of Castillon, desert, 1940, *Johnston & Muller 193* (LL); between San Rafael and San Vicente, via road over the northern foothills of the Sierra de las Cruces, about bushes, 8 Sep 1940, *Johnston & Muller 1057* (LL); mountain valley 24 km NW of Fraile, with much bare limestone, partially covered with *Agave* and *Yucca*, 2350 m, 25 03N 101 18 W, 16 Jul 1941, *Stanford et al. 426* (NY); 4 km N of Santa Elena, dry hillside, 10-15 cm tall, vicinity of Santa Elena Mines, calcareous E foothills of the Sierra de las Cruces, 9 Jun 1941, *Stewart 402* (LL); Sierra del Carmen, Canyon de Sentenela on Hacienda Piedra Blanca, moist stream side, 6 Jul 1936, *Wynd & Mueller 525* (ARIZ). **Durango**. Mpio. Mapimi, top of Puerto de la Cadena, the pass through the Sierra de la Cadena, 28 km W of Mapimi on Hwy 30, limestone slopes and gullies with desert scrub of *Yucca*, *Opuntia*, *Fouquieria*, *Flourensia*, *Acacia*, *Agave*, etc, 5000 ft, 2 Jul 1986, *Sanders et al. 6650* (TEX). **Zacatecas**. Ojo de Agua, near Sombrerete, ca. 6500 ft, 5 Aug 1960, *Hevly et al. s.n.* (ARIZ).

6. **VERBENA JOHNSTONII** (Moldenke) Nesom, Phytologia 73: 321. 1992. **Map 6.** *Verbena perennis* var. *johnstonii* Moldenke, Phytologia 2: 150. 1946. *Verbena perennis* forma *johnstonii* Moldenke, Phytologia 44: 329. 1979. **TYPE**: **Mexico**. **Tamaulipas**. Mpio. Miquihuana. 12 km NW of Palmillas on the road to Miquihuana, in broad, damp river beds, varied vegetation of large shrubs, small trees and herbs, flowers blue, 1950 m, 14 Aug 1941, *L.R. Stanford, K.L. Retherford, and R.D. Northcraft 915* (holotype NY!, digital image!; isotype: MO!, digital image!).

Plants perennial, taprooted. **Stems** erect, commonly 5–10 arising from the root crown, 30–50 cm, densely hispidulous-hirtellous, minutely stipitate-glandular. **Leaves** mostly linear to linear-oblong, basal and lower cauline persistent, midstem blades 3–5 cm x 1–2 mm, midvein impressed adaxially, margins entire or sometimes the proximal with 1–2 pairs of linear, widely divergent to falcate-recurved lobes 5–10 mm long, narrowly but strongly revolute, densely hirtellous, minutely stipitate-glandular; sessile, not clasping. **Fruiting spikes** solitary, elongate and slender, 10–25 cm; floral bracts narrowly ovate-lanceolate, 3–4(–5) mm, shorter than or barely equalling the calyces. **Calyces** 3.5–4(–5) mm, densely hirtellous, minutely stipitate-glandular, lobes linear-lanceolate, not connivent. **Corollas** purple to blue with a white throat, tubes 4–5 mm, limbs 6–7 mm in diam. **Nutlets** 2–2.8 mm, commissural faces ending below the nutlet tips, with plates bullate or at least the upper plates low-papillate. 2n = unknown.

Flowering Mar–Oct. Matorral, juniper woodland, pine-oak woodlands; (750–)1800–2400 m; Mexico (Coahuila, Nuevo León, Tamaulipas, Zacatecas).

O'Leary et al. (2010) have returned *Verbena johnstonii* to its original taxonomic position as a variety of *V. perennis*, based on the similarity of the two taxa in linear to sublinear leaves, with the comment (p. 100) that "siendo la pubescencia lo unico que las diferencia, lo cual no es lo suficiente para sostener una especie." Leaf shape, however, was not the only difference noted in the elevation of *V. johnstonii* to specific rank (Nesom 1992).

Verbena johnstonii and *V. perennis* are allopatric and non-intergrading. In addition to the completely discontinous difference in vestiture (O'Leary et al. noted that the vestiture of *V. johnstonii* is similar to that of *V. canescens*), Nesom (1992) also pointed out that *V. johnstonii* has white-throated corollas and papillate commissural faces, while *V. perennis* has blue to purple corolla throats and consistently bullate, non-papillate commissural faces. In *V. johnstonii*, the midstem blades are 30–50 mm long, while in *V. perennis*, they are (5–)10–25 mm long; and if lobes are present, they are differently shaped. There would never be an issue in identifying a plant as one or the other species.

Several collections mapped earlier as *Verbena johnstonii* (Nesom 1992) are here treated as narrow-leaved variants of *V. canescens*: **Coahuila**. Sierra la Gavia, *Johnston et al. 10284D* (LL); N side of Sierra Paila, *Johnston et al. 11687* (MO); Sierra de San Lazaro, *Muller 3045* (LL). **Nuevo León**. Cañon de Potrerillos, *Johnston et al. 10235B* (LL). These might be construed as hybrids, but they are from north of the range of typical *V. johnstonii*. In any case, the close similarity between *V. johnstonii* and *V. canescens* suggests that they may be sister species.

Additional collections examined. **Mexico**. **Coahuila**. Mpio. Parras. Parras–>Tanque Menchaca, S slope of Sierra de Parras, roadside shale hillside, 1980 m, 9 Nov 1999, *Hinton et al. 27464* (HINTON-digital image!); ca. 6 km airline W of Saltillo, E extremity of the Sierra de la Vega, 3 Mar 1973, *Johnston et al. 10500C* (LL); Mpio. Castanos, Puerto de San Lazaro, Sierra de San Lazaro, 30 Aug 1939, *Muller 3045* (LL); Mpio. Parras, Sierra de Parras, ca. 11 air mi S of Parras on road toward Menchaca, S- and W-facing slopes in limestone and shale, veg. of *Dasylirion*, *Yucca*, *Ocotillo*, *Rhus*, *Gochnatia*, *Leucophyllum*, *Viguiera*, ca. 1980–2000 m, 19 Sep 1993, *Nesom 7642* (MO, TEX); Sierra de Parras, Mar [year?], *Purpus 1094* (MO, NY); 9 km S of Parras on Sierras

Negras, 3 Jul 1941, *Stanford et al. 198* (MO), *Stanford et al. 234* (MO, NY); valley 15 km W of Concepción del Oro, just within Coahuila border, valley floor sparsely covered with *Yucca* and *Larrea*, 2300 m, 19 Jul 1941, *Stanford et al. 486* (MO, NY); Ojo Caliente, limestone slope S of town, 16 Aug 1979, *Wagner et al. 4132* (MO); 10 mi N of Saltillo, limestone hillside, 25 Aug 1961, *Waterfall 16623* (SMU). **Nuevo León**. Mpio. Galeana, 5.3 km E of El Potosí on road to Cerro Potosí, 22 Apr 1984, *Cowan 4636* (ANSM, MEXU, MO, TEX, UAT); 5 km S of Puerto México, KM 812, carretera México-Saltillo, 18 May 1965, *Hernández s.n.* (LL); above Santa Rita, 14 May 1981, *Hinton et al. 18241* (MO, TEX); W slope Potosí, 29 Jun 1983, *Hinton et al. 18487* (TEX); above San Ubert, 20 Mar 1992, *Hinton et al. 21853* (NY, TEX); Mpio. Galeana, San Roberto to Y, gypsum hillside, 2015 m, 5 Sep 1995, *Hinton 25501* (TEX); Mpio. Aramberri, near San Francisco, 1765 m, gypsum hillside, 1 Jun 1997, *Hinton 27065* (TEX); Mpio. Galeana, SW of Laguna de Labradores, arid gypsum hillside, 2264 m, 17 Oct 2003, *Hinton 28025* (TEX); foothills below Pablillo, 15 mi SW of Galeana, 21 May 1934, *Muller 506* (TEX); Mpio. Derrumbadero, Cañon de los Capulines, above San Enrique, Hacienda San José de Raices, 6 Aug 1935, *Mueller 2375* (MO, TEX); Mpio. Galeana, ca. 38 km ENE of Dr. Arroyo, NNW side of Cerro Peña Nevada, road crossing of exposed gypsum area, 2130 m, 1 Aug 1983, *Nesom 4778* (TEX); 5.6 mi S of jct Hwy 61 and Linares-San Roberto road, 26 Oct 1981, *Poole 2494* (TEX); ca. 15 mi E of San Rafael off Hwy 57, 22 Jul 1977, *Wells & Nesom 91* (LL). **Tamaulipas**. The type collection. **Zacatecas**. Ca. 3.5 air mi W of Concepción del Oro on rock-paved road to Mazapil in mountains, 0.5 mi W (below) the crest of the range in woodlands of *Pinus johannis* with *Yucca carnerosana*, *Lindleya*, *Nolina*, *Eupatorium*, *Stevia*, etc., 2200 m, 27 Jun 2001, *Henrickson 22692* (TEX); Puerto de Rocamontes at the Zacatecas-Coahuila state line, 29 Mar 1973, *Johnston et al. 10489* (LL); 10.5 mi from Concepción del Oro toward Mazapil, 24 Aug 1977, *Lehto 21751* (LL); 15 km W of Concepción del Oro, 20 Jul 1941, *Stanford et al. 507* (MO).

7. VERBENA LIVERMORENSIS Turner & Nesom, **sp. nov. Fig. 3, Map 7. TYPE: USA. Texas.** Jeff Davis Co.: Davis Mtns., on gravel and sand bars of creeks, 11 Jun 1926, *E.J. Palmer 30791* (holotype: TEX!; isotypes: MO!, TEX!).

Verbenae hirtellae similis in ubique aspectu et distributiem sympatriam habens sed differt distributio geographic restrictiori et caulibus setoso-villosis plerumque eglandulosis.

Plants perennials, taprooted. **Stems** 1–3 from the base, often much-banched proximally, erect to ascending-erect, 35–65 cm, sparsely hirsute-pilose, bristly-hirsute, or bristly-pilose, eglandular to very sparsely stipitate-glandular. **Leaves** evenly distributed along the stems, basal and lower cauline deciduous by flowering, narrowly oblanceolate to oblong-oblanceolate, midstem 1.5–5 cm x 3–8(–12) mm, margins coarsely serrate with (2–)3–8 antrorse teeth per side, rarely somewhat 3-lobed, narrowly revolute, veins impressed adaxially, adaxial surface shiny, basally attenuate to a petiolar region 2–8 mm, hirsute and stipitate-glandular on both surfaces. **Spikes** 1 or 3(–5) from medial branches, densely to elongate and loose with slightly overlapping fruits, 5–22 cm; floral bracts ovate-lanceolate, slightly shorter than the calyces; rachis stipitate-glandular. **Calyces** 3.5–4 mm, hirsute-hirtellous, stipitate-glandular; lobes triangular, subconnivent. **Corollas** violet to blue, tubes 4–4.5 mm, 1.5–2 mm longer than the calyces, limbs 4–6 mm in diam. **Nutlets** 1.6–2.2 mm, easily separating, commissural ending below the nutlet tips, plates silver-white, mostly bullate or distal sometimes papillate.

Flowering Jun–Oct. Creek sides, rocky slopes, pine-oak woods; 1800–2600 m; N.Mex., Tex.; Mexico (Coahuila).

The existence of *Verbena livermorensis* as a distinct taxon was first pointed out by Turner et al. (2003), who mapped it under that name (unpublished at the time). It is characterized by sparsely bristly-villous, mostly eglandular stems, evenly distributed and even-sized, non-lobed but coarsely serrate leaves with narrowly revolute margins, mostly solitary spikes, and stipitate-glandular calyces.

In the Texas Atlas (Turner et al. 2003), *Verbena livermorensis* was segregated from *V. neomexicana* and the two were mapped as sympatric, each of abundant occurrence in trans-Pecos Texas. In the present study, those collections identified in the Atlas as *V. neomexicana* are *V. hirtella*. Both *V. livermorensis* and *V. hirtella* were identified as *V. neomexicana* by Moldenke (1970) in the Texas Manual. The serrate but essentially unlobed leaves of *V. livermorensis* and *V. hirtella* distinguish them from *V. neomexicana* and *V. xylopoda*.

Additional specimens examined. **USA. New Mexico. Lincoln Co.**: White Mts., gravel loam of E slope, ca. 7900 ft, 30 Jun 1969, *Hutchins 2160* (UNM); White Mts., gravel loam of NW slope, ca. 7400 ft, 24 Oct 1969, *Hutchins 2681* (UNM); White Mts., gravel loam of Three Rivers Campground, ca. 6300 ft, 8 Aug 1970, *Hutchins 3219* (UNM); White Mts., gravel loam, vicinity of Eagle Creek, 6 mi W of Alto, ca. 7600 ft, 3 Aug 1972, *Hutchins 3862* (UNM); Capitan Mts., talus slope, mixed conifer, 2 Oct 1982, *Sivinski s.n.* (UNM); Capitan Mts., along FS Rd 56, ponderosa pine and pinyon-juniper-oak woodland, ca. 2100 m, 1 Aug 1976, *Wagner & Sabo s.n.* (UNM); White Mts., along Ruidoso Creek, 6600 ft, 3 Jul 1895, *Wooton s.n.* (NY); White Mts., Ruidosa, Camp VI, 6600 ft, 3 Jul 1895, *Wooton s.n.* (UNM); White Mts., 7000 ft, 12 Aug 1897, *Wooton s.n.* (NY); White Mts., 7400 ft, 25 Aug 1907, *Wooton & Standley s.n.* (UNM); White Mts., Eagle Creek Canyon, ca. 2500 m, 1 Jul 1984, *Worthington 12179* (NY). **Otero Co.** [labeled as "Lincoln Co.]: Sacramento Mts., North Tularosa Canyon, Mescalero Apache Indian Reservation, 8000 ft, 10 Aug 1931, *Huber s.n.* (MO); White Mtn Wilderness, S-facing slope, open forest, *Pinus ponderosa*, *Q. undulata*, *Q. gambelii*, *Opuntia imbricata*, ca. 2100 m, 18 Sep 1976, *Wagner 2702* (UNM); White Mtn Wilderness, below White Horse Hill along ridge, SSE-facing slope, Doug fir, *Cercocarpus*, *Fendlera*, *Quercus*, ca. 2650 m, 18 Sep 1976, *Wagner s.n.* (UNM). **Texas. Brewster Co.**: in the Laguna of the Chisos Mts., sparse in deep igneous soil, 6000 ft, 10 Sep 1950, *Warnock 9677* (LL, SMU); Chisos Mountains State Park, July 1935, *Marsh s.n.* (TEX); Chisos Mtns., 20 Jun 1931, *Mueller 8138* (TEX), 22 Jun 1931, *Mueller 8138* (MO, NY-2 sheets, TEX). **Jeff Davis Co.**: Davis Mts.: Livermore Peak, 9-12 Jul 1921, *Ferris & Duncan 2607* (NY); Livermore Peak, 9-12 Jul 1921, *Ferris & Duncan 2609* (MO); Mt. Livermore, Upper Limpia Canyon, 15 Sep 1934, *Hinkley s.n.* (TEX-2 sheets); Mt. Livermore, Limpia, 15 Sep 1934, *Hinckley 170* (NY); S slope Mt. Livermore, 8000 ft, 13 Aug 1935, *Hinckley 170* (NY); Limpia Canyon, Mt. Livermore, Jul 1936, *Hinckley s.n.* (ARIZ); Upper Limpia Canyon, ca 1 mi E of Mt. Livermore, ca. 2250 ft, 5 Jul 1936, *Hinckley s.n.* (NY); on gravel and sand bars of creeks, 11 Jun 1926, *Palmer 30791* (TEX); near base of Sawtooth Mtn., amongst rubble along bed of small stream, 3 Oct 1926, *Palmer 31867* (TEX); Black Mt., 13 Aug 1926, *Tharp 4493* (TEX); lower Madera Canyon, mountain NW of Timber Mt., near Hunsaker Resort, 21 Jun 1977, *Weedin & Crabtree 633* (TEX); along jeep trail above creek in lower Madera Canyon, ca. 5500 ft, 29 June 1977, *Weedin & Crabtree 821* (TEX); Fort Davis, 13 Sep 1918, *Young 1703* (TEX). **Presidio Co.**: near summit of Chinati Peak in igneous soils, ca. 7700 ft, scattered perennial herb on upper slopes throughout the Chinatis, 7 Jun 1977, *Butterwick & Lott 3775* (TEX). **Mexico. Coahuila**. Del Carmen Mts., 20 Aug 1936, *Marsh 575* (TEX); Del Carmen Mts., 9 Aug 1936, *Marsh 684* (TEX-2 sheets); Mio. Ocampo, Sierra Madera del Carmen, 3.2 road mi SW of Campo Cinco towards Las Pilares, W-facing slope with *Pinus cembroides*, *Quercus grisea*, *Q. sideroxyla*, *Cercocarpus*, *Juniperus deppeana*, *Stipa tenuissima*, *Muhlenbergia*, etc, 2100 m, 11 Aug 2004, *Riskind et al. 23834* (TEX-2 sheets); Sierra del Carmen, Fresno Mesa, 28° 88.75' N, 102° 52.68' W, oak woodland, 1927 m, 2 oct 1997, *Wood et al. s.n.* (UNM); Mpio. Villa Acuña, Sierra del Carmen, Canyon de Sentenela on Hacienda Piedra Blanca, moist stream side, 6 Jul 1936, *Wynd & Mueller 525* (MO, NY).

The duplicate of *Wynd & Mueller 525* at TEX is *Verbena hirtella*.

8. VERBENA MORANII Nesom, **sp. nov. Fig. 4, Map 1. TYPE: Mexico. Baja California.** [Sierra San Pedro Martir], ca. 4 km N, 60 degrees E of Cerro Piñon, 31° 38.5' N, 115° 59.75' W, occasional on metamorphic hill, 1100 m, 18 Sep 1977, *R. Moran 24936* (holotype: LL!;

isotype: LL!, SD). Moran's field notebook (Moran 2009) indicates that 4 duplicates in total were collected.

Verbenae pinetorum similis sed differt vestimento caulini glandulosi eglandulosi redacti sed distinctus caulibus plerumque glabris eglandulosis et calycibus proprie sessili-glandulosis.

Plants perennial herbs, taprooted. **Stems** 3–10 from the base, erect to ascending-erect, ca. 30–70 cm, glabrate to sparsely hirsutulous or hirsutulous-hirtellous, sparsely sessile- to stipitate-glandular. **Leaves** obovate to oblanceolate, ovate, or lanceolate in outline, basal and lower cauline deciduous by flowering, midstem blades 1.5–3.5 cm x 4–11 mm, margins coarsely serrate with 1–4 teeth per side, sometimes 3-lobed or pinnately lobed, veins impressed adaxially, hirsutulous to hirsute-villous adaxially, stipitate-glandular, hirsute abaxially mostly along the veins, basally attenuate to a petiole 3–12 mm. **Spikes** 1 or 3(–5) from distal branches, dense to open-elongate, 8–20(–30) cm; rachis hirtellous-hirsutulous, minutely stipitate-glandular; floral bracts ovate-lanceolate, usually equal or shorter than the calyces. **Calyces** 3.5–4 mm, hirtellous to hirsute-hirtellous, densely minutely sessile- to stipitate-glandular, lobes narrowly triangular, connivent. **Corollas** light blue to deep blue, tubes 3.5–5(–6) mm, 1–3 mm longer than the calyces, limbs (2.5–)3–5 mm in diam. **Nutlets** 2–2.5 mm, commissural faces ending below the nutlet tips, plates white, densely bullate-papillate.

Flowering Apr–Oct. Rocky slopes; 780–1425 m; Mexico (Baja California).

Verbena moranii is distinct in its glabrate to sparsely hirsutulous stems and characteristically sessile-glandular calyces. The collections by Moran are from a relatively small area of the Sierra San Pedro Mártir, between 31° 05' to 44' N and 115° 53.5' to 116° 02' W. The species is named for Reid Moran. Dr. Moran died 21 Jan 2010 at age 93 (Gonzalez 2010; Kent 2010; Vanderplank 2010).

Additional collections examined. **Mexico**. **Baja California**. Granitic soil on foothills of Sierra San Pedro Martir in vicinity of Rancho San Jose, 25 mi E of San Telmo, 2600 ft, 23 Feb 1931, *Meling 3* (NY); 3 mi S of El Alamo, locally common on upper S slope of Cerro Piñon, 31° 38' N, 116° 01' W, 1425 m, 30 May 1970, *Moran 17658* (LL, plus 4 duplicates, fide Moran 2009); 2 mi W of Cerro Colorado, 31° 44' N, 116° 02' W, granitic soil of valley, occasional on rocky hillside, 1025 m, 21 May 1973, *Moran 20983* (LL, plus 3 duplicates); limestone Cerro El Bromador, occasional on SE slope, 31° 05' N, 115° 53.5' W, 780 m, 1 Jun 1976, *Moran 23387* (LL, plus 3 duplicates).

9. VERBENA NEOMEXICANA Small, Fl. S.E. U.S., 1010, 1337. 1903. **Map 8**. *Verbena canescens* var. *neomexicana* A. Gray, Synopt. Fl. N. Amer. 2(1): 337. 1878 [nom. illeg. superfl., as "Neo-Mexicana"]. *Verbena officinalis* var. *hirsuta* Torrey, Rep. U.S. and Mex. Bound., Bot. 2(1): 128. 1859. **NEOTYPE** (designated here): **USA. New Mexico**. [Grant Co.]: Borders of thickets, near Copper mines, 1851, *C. Wright 1497* (GH digital image!; isoneotypes: MO!, US digital image!). In Gray's description of *Verbena canescens* var. *neomexicana*, he placed Torrey's earlier *V. officinalis* var. *hirsuta* in synonymy, noting "Borders of thickets near the Coppermines, New Mexico, *Wright*, *Bigelow*. Appears as if a hybrid between *V. canescens* and *V. officinalis*. S. Arizona, similar in foliage but with long bracts, *Rothrock*." *Wright 1497* at GH is mounted on the same sheet as a Rothrock collection (Arizona. Fisch's Ranch, 5000 ft, Sep 1874, *J.T. Rothrock 693*).

In the protologue of *Verbena officinalis* var. *hirsuta*, the only collection cited by Torrey was "Near the Copper Mines, New Mexico, June; *Bigelow*." In his personal printed copy of the Botany of the Mexican Boundary Survey, however, Torrey penciled in "827" next to the text entry for *V. officinalis* and "827a" next to *V. officinalis* var. *hirsuta*. At NY are two specimens with printed labels as "Mexican Boundary Survey, … chiefly in the Valley of the Rio Grande, below Donana" and noting Parry, Bigelow, Wright, and Schott as collectors; both specimens are hand-numbered as "827" but have no other particular collector or locality

information. These plants, however, are *V. hirtella* and surely were collected in southwestern Texas, not in in the vicinity of the Copper Mines in Grant County, New Mexico.

Charles Wright and John Bigelow, along with George Thurber, Charles C. Parry, and Arthur Schott, all were part of the 1851 United States and Mexican boundary survey. Wright and Bigelow were both at the Copper Mines (but not Thurber, Parry, or Schott) and perhaps were collecting side by side. Torrey's 1859 protologue and Gray in 1878 both referred to Bigelow as the collector of *Verbena* from "near the Copper Mines," but the only specimens to be found from that locality are those labeled specifically as Wright's 1497, which is designated as the neotype.

Because Small's combination was based on an illegitimate name at varietal rank, *Verbena neomexicana* at specific rank is attributed solely to Small. As the basis of his combination, Small cited only "*Verbena canescens* var. *Neo-Mexicana* A. Gray." The original Bigelow collection cited by Torrey underlies all of the nomenclature but it has not been located in the present study and is supplanted by a neotype.

Verbena ×*neomexicana* Briquet (Nat. Pflanzenfam. IV, 3a: 148. 1894) was invalidly published (without a type or description)—it was intended as a name for a hybrid ("V. canescens x officinalis") and did not represent the same entity as Gray's "var. *neomexicana*."

Perennial herbs, taprooted. **Stems** 1–5 from the base, erect to ascending-erect, 30–70 cm, moderately hirsute with slightly upturned and/or downturned hairs, moderately stipitate-glandular. **Leaves** even in distribution and shape, basal and lower cauline usually deciduous by flowering, largest at midstem and above, mostly oblong in outline, pinnatifid to deeply pinnately toothed with 3–5 teeth or lobes per side, sometimes 3-lobed, blade midportions evenly oblong, midstem 2.5–5.5 cm x 10–20 mm, petiolar region not differentiated or 5–10 mm if so, veins slightly or not impressed adaxially, margins barely revolute or not at all, both surfaces hirsute, sparsely stipitate-glandular. **Fruiting spikes** 1–6 from medial and distal branches, 2–10(–14) cm, elongate and loose with non-overlapping fruits; rachis hirsute, stipitate-glandular; floral bracts 2–2.5 mm, ovate-triangular, shorter than the calyces. **Calyces** 2.5–3 mm, hirsute and hirtellous, stipitate-glandular, lobes triangular to lanceolate. **Corollas** blue to white, tubes 2.5–4 mm, 0.5–1 mm longer than the calyx, limbs 1.5–2.5 mm in diam. **Nutlets** 1.4–1.8 mm, commissural faces extending to the nutlet tip, densely minutely bullate, outer surfaces reticulate.

Flowering (Apr–)Jul–Sep. Juniper-oak, pine-oak, and ponderosa pine woodland; 1600–2300 m; Ariz., N.Mex.; Mexico (Chihuahua).

Verbena neomexicana as a species as treated here is narrower in concept than in most previous accounts, except for that of Perry (1933), who recognized three varietal taxa whose biological reality is confirmed in the present study (also see comments in the introduction of this manuscript). Although her identifications were not entirely consistent, Perry's distinctions based on differences in vestiture were valid. Each of the three varieties recognized by Perry is treated here at specific rank.

An interesting feature of *Verbena neomexicana* sensu stricto is that it may be more closely related to *V. menthifolia* Benth. and *V. madrensis* Nesom (series *Verbena*, see Nesom 2010) than to the species of ser. *Tricesimae*, those treated in the current overview. Commissural faces of nutlets in *V. neomexicana* extend to the very tip of the nutlet, in contrast with the other species here but similar to the species of ser. *Verbena*. Spikes of *V. neomexicana* tend to be relatively short, and the inflorescence branches are irregularly cymose and arise from medial and distal branches, also in contrast to ser. *Tricesimae*, where spikes are mostly solitary or few from proximal to medial branches, and more similar to those of ser. *Verbena*. *Verbena neomexicana* is distinguished from *V. xylopoda* by the set of contrasts below.

1. Stems loosely hirsute; leaves evenly distributed, basal and lower cauline not persistent; spikes from from medial to distal branches; corolla tubes 2.5–4 mm, limbs 1.5–2.5 mm in diam.; nutlets with commissural faces reaching the tip ..... **Verbena neomexicana**
1. Stems hispidulous to hirsutulous; leaves largest and often persistent basally and proximally; spikes from proximal to medial branches; corolla tubes 4–5 mm, limbs (3–)4–6(–7) mm in diam; nutlets with commissural faces not reaching the tip ..... **Verbena xylopoda**

Additionally, the leaves of *V. neomexicana* tend to be thinner with barely revolute margins and without veins deeply impressed adaxially.

Additional specimens examined. **USA. USA. ARIZONA. Cochise Co.**: Chiricahua Mts., Gulching Ground, Pine Canyon, campsite, 6700 ft, 5 Jul 1907, *Blumer 1612* (NY); Chiricahua Mts., Apache Pass, May 1881, *Lemmon 425* (ARIZ). **Graham Co.**: Santa Theresa Mts., Tule Springs, riparian woodland, 4800 ft, 25 Apr 1970, *Bingham 1741* (ASU digital image!). **NEW MEXICO. Catron Co.**: Gila Cliff Dwellings Natl. Monument, Cliff Dweller Canyon, E-facing slope, douglas fir-juniper-oak-walnut, 5815 ft, *Bennett 174* (ARIZ); Gila Cliff Dwellings Natl. Monument, Cliff Dweller Trail, ponderosa pine forest, tiny white flowers, 1795 m, 19 Jul 2001, *Bennett 902* (ARIZ); ravine below Gila Cliff Dwellings, deep ravine with springs seeping and a small stream, pinyon and juniper on the steep rocky sides and Douglas fir, *Ptelea*, *Rhamnus*, and *Prunus* in the ravine, 6000-6500 ft, 5 Jul 1952, *Dunn 8334* (UNM); near Luna, Datil Forest, 2140-2200 m, 17-20 Jul 1924, *Eggleston 20292* (NY); Datil Mts., Thompson Cave, volcanic soil, 8200 ft, 20 Jul 1976, *Fletcher 763* (UNM). **Grant Co.**: Pinos Altos Mts. [just N of Silver City], 23 Aug 1880, *Greene 12505* (MO, NY); 5.5 mi E of Santa Rita, 6500 ft, 15 Sep 1972, *Zimmerman 2239* (ARIZ). **Hidalgo Co.**: Peloncillo Mts., W of Cloverdale, Maverick Canyon, shady oak woods, 22 Aug 1955, *Castetter 9915* (UNM). **Socorro Co.**: Magdalena Mts., gravel loam of Sawmill Canyon, ca. 6700 ft, 16 Jun 1973, *Hutchins 4221* (UNM). "**Socorro Co.**" [or perhaps **Catron Co.**]: Mogollon Mts., on or near the West Fork of the Gila River, ca. 7000 ft, 28 Aug 1903, *Metcalfe 612* (ARIZ, MO, NY). **Sierra Co.**: [Black Range], bottom of Tierra Blanca Canyon, 6800 ft, upper woodland and yellow pine, 18 Aug 1916, *Chapline 609* (NY). **County unknown**: Pleasant Valley, 27 Jul 1895, *Mulford 508* (MO). **MEXICO. CHIHUAHUA**. Ca. 12 air mi WSW of Buenaventura, Rancho de la Tinaja, steep-sided canyons with frequent seasonal drainage, area dominated by pine and oak, 2000-2100 m, 30 Aug 1989, *Mayfield 190* (TEX).

Lemmon 425 from the Chiricahua Mountains in Cochise County has features suggestive of genetic influence from *Verbena plicata* Greene. *Blumer 1612* is typical of *V. neomexicana*.

Citations of *Verbena neomexicana* from Texas by Moldenke and others are based on misidentification of various species, primarily *V. hirtella* and *V. livermorensis*. Moldenke (1964) cited a collection of *V. neomexicana* from Maryland (near Baltimore, 1866, *LeRoy s.n.*, NY) and from Florida (county unknown, no collection data, VT)—these were either waifs or misidentifications and the species has never been subsequently reported from those states.

10. VERBENA PERENNIS Wooton, Bull. Torrey Bot. Club 25: 262. 1898. **Map 9. TYPE: USA. New Mexico**. Lincoln Co: crevices of rocks along the road about 2 miles west of the Mescalero Agency in the White Mtns, 6000 ft, 21 Jul 1897, *E.O. Wooton 187* (holotype: US-digital image!; isotypes: GH-digital image!, MO!-digital image!, NMC, NY! NY-digital image!, PH fide Perry (1933); US-digital image!).

Plants perennial herbs to subshrubs, taprooted. **Stems** 5–20 from the base, 15–35 cm, glabrous to glabrate, sparsely hispidulous, hispid-strigose, or hirsute-strigose, eglandular. **Leaves** linear, basal and lower cauline deciduous by flowering, midstem (5–)10–25 mm x 0.6–1.6 mm,

margins entire or proximal with a pair of linear teeth or lobes, revolute and usually obscuring the abaxial surface, sparsely hispid-strigose, eglandular; sessile. **Spikes** solitary or 2–3 from proximal branches, elongate and slender, 3–12 cm; floral bracts ovate-lanceolate, 2–3 mm, shorter than the calyces. **Calyces** 3.2–4 mm, hirtellous to hispid-strigose, minutely stipitate-glandular, lobes linear-lanceolate, not connivent. **Corollas** blue to purple or purplish lavender, without a white throat, tubes 4.5–6 mm, 1.5–2 mm longer than the calyx, limbs 5–8 mm in diam. **Nutlets** 1.8–2.1 mm, commissural faces not reaching nutlet apex, with bullate plates.

Flowering (Mar–)Apr–Sep. Rocky hillsides, roadsides, thorn scrub-grassland, juniper, pinyon-juniper, oak-juniper-pine; 1500–2000 m. USA (New Mexico, Texas; Mexico (Coahuila).

Kearney & Peebles (1960) cited a collection of *Verbena perennis* from Arizona: "Pima Co.: Baboquivari Mts., *Jones 24994*." This collection has not been located in the present study, but it is far out of range for the species and presumably either misidentified or mislabeled.

Collections examined from Mexico: **Coahuila**. 24 km by winding rd N of Las Norias toward Chupadero del Caballo, SW of Cañon del Colorado, 102° 12' 0.0", 29° 21' 0.0", limestone hills with *Dasylirion*, *Quercus*, *Rhus*, 12 Sep 1972, *Chiang, Wendt & Johnston 9178* (LL); ca. 22 (air) mi due E of Boquillas, due NE of Pico de Sentenela of the Sierra del Carmen, 3 mi E of Rancho Piedra Azul, 102° 33' 0.0", 29° 8' 0.0, rocky limestone slopes with *Dasylirion*, *Yucca*, *Acacia*, *Hilaria*, *Mimosa*, *Dalea*, 26 Jul 1973, *Henrickson 11366* (TEX); Muzquiz, Cd. de Melchor Múzquiz, about 100 mi NW of, Sierra Hermosa, Rancho La Morada of Mr. And Mrs. Aldan McKellar, 102° 32' 36.18", 28° 54' 23.2", 12 May 1968, *Latorre s.n.* (TEX); Del Carmen Mts., 9 Jun 1936, *Marsh 859* (TEX-2 sheets); Santa Rosa Mts., 14 Jul 1938, *Marsh 1378* (TEX); Muzquiz, Cd. de Melchor Múzquiz (Múzquiz), ca 140 Km NW rd of on Coa Hwy 2A (Mzq.-Boquillas), Cuesta del Plomo area, ca 0.5 rd mi S on rd originating just SE of crest of 2A, 102° 19' 59.31", 28° 40' 10.37", limestone area, scattered pine-oak woodlands with *Yucca* and *Dasylirion*; ridge top and sides, dry ravine with shade banks; meadow, mostly along slopes of small stream, also in low meadow, 4 Jun 1992, *Nesom 7462* with Mayfield (TEX).

The westernmost collection from New Mexico is this: **Sierra Co.**: Berendo [Berrenda] Creek, in and around the S end of the Black Range, limestone hills, 5500 ft, 13 May 1905, *Metcalfe 1568* (MO!, NMC fide SEINet and Rich Spellenberg, NY!). A collection was mistakenly databased (SEINET) as *Verbena perennis* from Grant Co., New Mexico, but this is actually from Lincoln County ([Lincoln Forest], lower part of Cave Cañon, 11 Sep 1916, *Chapline 652*, NMC).

11. VERBENA PINETORUM Moldenke, Phytologia 2: 27. 1941. **Map 10**. **TYPE**: **Mexico. Chihuahua**. Sierra Charuco, Rio Fuerte, pine flats, transition habitat, 23 Jul 1935, *H.S. Gentry 1522* (holotype: ARIZ, digital image!, photo-NY!; isotypes: ARIZ digital image!; MO!). The ARIZ isotype is dated "22" July, but this probably was a typo since all other data, including the collection number, are identical. The MO label exactly duplicates the holotype label.

Plants perennial, taprooted. **Stems** 1–5 from the base, erect to ascending-erect, 25–60 cm, sparsely to moderately hirsute-villous to bristly-hirsute, eglandular. **Leaves** ovate to lanceolate in outline, all pinnatifid or 3-lobed, lobe margins coarsely serrate, basal and lower cauline deciduous by flowering, midstem blades 2–4 cm x 8–17 mm, hispid-hirsute, eglandular; petiolar region 3–15 mm. **Spikes** 1 or 3(–5) from medial to distal branches, elongate and slender, (3–)6–21 cm; floral bracts narrowly triangular to narrowly ovate-triangular, slightly longer to slightly shorter than the calyces. **Calyces** 3.5–4 mm, hirsute to hirtellous, sparsely minutely stipitate-glandular, lobes triangular, connivent to subconnivent. **Corollas** lavender, purple, blue-violet, or pink-purple, tubes 4.5–5.5 mm,

1–1.5(–2) mm longer than the calyces, limbs (5–)6–9 mm in diam. **Nutlets** 1.8–2 mm, commissural faces not reaching nutlet apex, densely bullate-papillate.

Flowering Jul–Sep(–Oct). Oak-pine-maple, pine-oak, oak-juniper, pine-oak-juniper, and oak and oak-manzanita woodland, rocky and gravelly slopes, roadsides, ditches, disturbed sites; 1300–2200(–2700 in Mexico) m; USA (Arizona); Mexico (Chihuahua, Sonora).

Verbena pinetorum is distinctive in its hirsute-villous to bristly-hirsute, eglandular stems, pinnatifid basal and cauline leaves, and large flowers (calyces and corollas). Based on their reading of the protologue, O'Leary et al. (2010) treated it as possibly a synonym of *V. neomexicana* var. *neomexicana*, noting that they were not able to locate the type specimen after consulting herbaria housing collections of "F. Shreve." Moldenke (1964b), however, clearly indicated that the type is deposited at the University of Arizona.

Additional specimens examined. **USA. ARIZONA. Cochise Co.**: Huachuca Mts., Garden Canyon, 3 Sep 1928, *Harrison & Kearney 5796* (ARIZ); Huachuca Mts., Sunnyside, 6000 ft, 3 Oct 1937, *Kearney & Peebles 13847* (ARIZ); SW side of Huachuca Mts., gentle rocky slope of W side Scotia Canyon, oak-juniper woodland, 6000 ft, 14 Sep 1988, *McLaughlin 5245* (ARIZ); Parker Canyon Lake Recreation area, juniper-grassland and riparian, 12 Oct 1968, *Pinkava et al. 14553* (NY-2 sheets); Huachuca Mts., 3.5 mi WNW of Montezuma Pass on Parker Canyon Road, 5700 ft, oak woodland, 11 Aug 1990, *Van Devender 90-348* (ARIZ); Ft. Huachuca, Aug 1892, *Wilcox s.n.* (NY); Huachuca Mts., Bear Canyon, scattered plants in canyon bottom near stream, 5800 ft, 26 Sep 1980, *Yatskievych 80-743* (ARIZ). **Santa Cruz Co.**: Ruby, 23 Aug 1939, *Darrow s.n.* (ARIZ); W slope of Atascosa Mts., Sycamore Canyon, Goodding RNA, canyon bottom, riparian, 7 Sep 1987, *Franklin 5402* (NY); Sycamore Canyon, 30 Aug 1938, *Goodding 6009* (ARIZ); Sycamore Canyon, 23 Jul 1967, *Hesselberg s.n.* (ARIZ); near Ruby, rocky canyon side between Bear Valley Ranch and Penasco Canyon, 3850 ft, 20 Aug 1949, *Kaiser 49-248* (ARIZ); Pena Blanca-Ruby Road, ca. 2 mi E of Ruby, oak-manzanita woodland, 1310 m, 11 Aug 1999, *McLaughlin 8017* (ARIZ); Sycamore Canyon, Goodding Research Natural Area, 3500 ft, 23 Aug 1974, *Reeves R1198* (NY); Santa Rita Mts., Gardner Canyon, 27 Aug 1977, *Van Devender & Kearns s.n.* (ARIZ, LL). **MEXICO. CHIHUAHUA.** Mesa La Pulvosa, 7 km SSE of Talayotes, active airstrip of Col. Davis in the 1950s, serving La Republica Mine, in open road of former pine-oak-madrono forest, 12 Aug 1958, *Commisaris s.n.* (ARIZ); ca. 35 mi from Temosachic, along Hwy 16, roadside area, returning from Madera, pinyon pine-oak forest, 7900 ft, 3 Aug 1977, *Dunn et al. 22610* (MO, NY, TEX); Pinos Altos, barrens of juniper, bare ground, 2250 m, 27 Jun 1986, *Ferguson s.n.* (ARIZ); along road from Las Chinacas to Huicochic, 3 mi N of Las Chinacas, ca. 40 km NW of Alamos, 1500 m, S-facing slope with seeps on road cut below cultivated fields in pine-oak forest, 22 Aug 1993, *Fishbein 1350* (ARIZ); Yécora, vicinity of cabañas on old road to Maycoba, 0.5 mi E of Arroyo Yécora, open pine-oak forest, 1550 m, *Fishbein 2469* (ARIZ); Sierra Charuco, Rio Fuerte, transition, pine region, scarce on dry gravel benches and slopes, 11 Sep 1935, *Gentry 1758* (ARIZ, MO); Cerro Quicorichi [27.75°, 108.65°, between Las Chinacas and La Lobera on road to Chinipas] Rio Mayo, transition, open pine slope, 5000 ft, 3 Oct 1935, *Gentry 1923* (ARIZ); Sierra Charuco, Rancho Byerly, rocky igneous slopes, pine-oak forest, 5000-58000 ft, 17-25 Apr 1948, *Gentry 8150* (ARIZ); 6.4 mi W of Cocheño Bridge on Hwy 16, disturbed roadside, 28 Jul 1988, *Hathaway & Holm s.n.* (ARIZ); Cuiteco, rocky field, 18 Jul 1958, *Knobloch 935* (SMU); Nabogame, 28° 30', 108° 30', field, 1800 m, 29 Jul 1987, *Laferriere 587* (TEX); Mpio. Madera, Laguna de Babicora, Cerro La Concha, pino-encino, 2450 m, 18 Aug 1994, *Lebgue et al. 3202* (NY); Las Varas, 12.8 km W of Yepachi, rocks in oak woodland, 1600 m, 22 Oct 1984, *Levin 1469* (LL); Pinos Altos, barrens of juniper, bare ground, 2250 m, 26 Jul 1986, *Martin et al. s.n.* (ARIZ); Rio Mayo drainage 1 km SE of mining town of Concheño, 2100 m, pine-oak forest with patches of altered soil, 4 Jul 1992, *Martin & Barber s.n.* (ARIZ); Rancho El Rayo between Las Chinacas and La Lobera on road to Chinipas, 1500 m, pine oak woods, small arroyo bottom and hillslope, 18 Aug 1991, *Martin & Yetman s.n.* (ARIZ); roadside W of Ocampo

near Km 32, 2050 m, NE exposure, 25 Jul 1986, *Martin et al. s.n.* (ARIZ); near sawmill, El Campo (El Serrochito on 1:50,000 map), 2000 m, Rio Mayo drainage, 14 Aug 1982, *Martin & Mellink s.n.* (ARIZ); ca 9.8 mi E of Madera on Hwy 28 (37 by road sign) and 3.8 mi E of RR crossing with the same Hwy at Preson de Galondrinas, wet roadside ditch with *Polygonum*, 2170 m, 31 Aug 1989, *Mayfield 280* (TEX); Mpio. Temosachic: common on rocky slopes in open pine-oak forest, Canon Huahuatan, 10 mi SE of Madera, 23 Sep 1939, *Muller 3427* (LL); Yepachic, 16 Jul 1970, *Pennington 43* (TEX); Mpio. Madera, Laguna de Babicora, alrededores de El Alamillo, bosque pino-encino, 2200, 18 Aug 1994, *Quintana & Estrada 3146* (BRIT, NY); Mpio. Madera, Laguna de Babicora, Arroyo El Jaral, bosque de pino-encino, 2300 m, 10 Sep 1994, *Quintana & Estrada 3589* (NY); ca 40 km E of Chuhuichupa along the road to Las Varas, 20 km SE of Mesa del Hurucan, 29° 37' N 108° 11' W, deep canyon in volcanic tuff, oak-pine-maple woodlands, 2000 m, 9 Aug 1977, *Sanders 1049* (TEX); Mpio. Ocampo: Parque Nacional "Cascada de Basaseachic," in shallow soil over bedrock near the Divisadero overlook, open juniper, pine, oak, 2200 m, 31 Jul 1988, *Spellenberg et al. 9559* (NY, TEX); 10 mi NW of Pacheco/Willy jct on road to Rancho Willy, in pine-oak-manzanita community, white chalky soil, ca. 6000 ft, 11 Jul 1997, *Spencer & Atwood 586* (TEX); Basaseachic Falls, pine-oak forest, 6800 ft, 14 Jun 1984, *Titley s.n.* (ARIZ); near Colonia Garcia in the Sierra Madres, 7500 ft, 29 Jul 1899, *Townsend & Barber 192* (MO, NY, TEX); 82 mi (road) W of Vieja Casas Grandes, 6500 ft, pine-oak woodland, 25 Aug 1952, *Tucker 2508* (LL, ARIZ); 15 mi E of Madera, 7200 ft, 8 Aug 1976, *Walker 76H37* (MO, NY); along road between Babicora and Yepomera in yellow pine forest, near the divide, 8000 ft, 4 Aug 1977, *Wieder et al. 236* (MO); 14 km ENE of Colonia Pacheco, on the winding road to Colonia Juarez, 2150 m, gentle slopes of extrusive igneous rock, with oak and pine, 31 Jul 1972, *Wilson & Johnston 8510* (LL); Mpio. Ocampo, 2 km antes de Cieneguita, *Pinus-Juniperus*, 2000 m, 5 Aug 1994, *Yen & Estrada 2778* (BRIT). **SONORA**. Mesa Grande, willow oak-Apache pine-juniper, 1800 m, 12 Aug 1987, *Martin & Kryzanowski s.n.* (ARIZ); Mesa El Campanero between Yecora (Sonora) and Bermudez (Chihuahua), pine-oak forest, 17 Aug 1985, *Martin & Turner s.n.* (ARIZ); 20 km W of Yecora, abundant on disturbed slopes with *Penstemon campanulatus*, 17 Aug 1991, *Neff 91-10* (TEX); Maicoba, 20 Jul 1970, *Pennington 66* (TEX); Maicoba, 5000 ft, Jun 1968, *Pennington 74* (TEX); Yecora, 3 Aug 1970, *Pennington 98* (TEX); Yecora, baseball field next to the cemetary, camping site, disturbed and grazed, 5 Sep 1996, *Porter 11150* (TEX); 1.6 km S of Tierras de Ascensio, ca. 7.6 km (by air) W of Yecora, 2.5 km ENE of microwave tower on Mesa del Campanero, pine-oak forest, 1780 m, 8 Aug 2000, *Reina G. 2000-415* (ARIZ); Los Pilares, Arroyo Los Pilares, ca. 23 km E of Yecora, 26 km W of Maycoba on Mexico 16, 1260 m, 8 Sep 1995, *Reina G. 95-470* (ARIZ); Ranchito Pinos Altos, Sierra Nacori, riparian oak woodland, 2 Aug 1969, *Robinson s.n.* (ARIZ); Sierra de Mazatán, Mpio. de Ures, Represo 0.3 km SW del Rancho El Bachán, bosque de encino, 1440 m, 3 Oct 2003, *Sanchez & Espericueta s.n.* (ARIZ); Mpio Yecora, Puerto de la Cruz, N base of Mesa del Campanero, pine-oak forest, 28 22 37, 109 02 20, 1900 m, 8 Sep 1996, *Van Devender 96-497* (TEX); Rancho de la Nacha, region of the Rio de Bavispe, oak-grassland, 4300 ft, 17 Aug 1941, *White 3985* (ARIZ); El Rancho del Roble, NE of El Tigre, region of the Rio de Bavispe, 6000 ft, 2-13 Sep 1941, *White 4176* (ARIZ).

Moldenke (1964b) cited an Arizona collection of *Verbena pinetorum* as from Pima Co. (Old Baldy, 28 Aug 1904, *S.L. Berry s.n.*, CAS), but surely this is from Old Baldy of the Santa Rita Mountains of Santa Cruz County. He also cited collections from Durango, Nuevo León, and San Luis Potosí, which are out-of-range for *V. pinetorum* and instead probably some other species.

Another collection, intermediate in vestiture, may be a hybrid between *Verbena pinetorum* and *V. xylopoda* (Cochise Co., [Huachuca Mts.,] Sunnyside to Elgin, 5330 ft, 3 Oct 1937, *Kearney & Peebles 13863*, ARIZ).

12. VERBENA SUBULIGERA Greene, Pittonia 1: 156. 1888. **Map 2**. **LECTOTYPE** (designated here): **Mexico**. Durango. From the Sierra Madre, west of Durango, 8100 ft, Sep and Oct

1881, *A. Forrer s.n.* (NY! digital image!; isolectotypes: ARIZ!, F digital image!, GH digital image!, MO!, PH, UC fide Moldenke 1965, US digital image!). There is no specimen of *Verbena subuligera* at ND-Greene, fide Barbara Hellenthal. The NY sheet has Greene's annotation as "*Verbena subuligera* n. sp." and his handwritten notation of the publication information in Pittonia.

Perennial herbs, taprooted. **Stems** 1–4 from the base, few-branched, erect to ascending-erect, sometimes decumbent-ascending at the base, 8–30 cm, hirsute and hirsutulous, eglandular or sparsely stipitate-glandular near the base. **Leaves** oblong to oblong-oblanceolate or oblong-lanceolate in outline, pinnately toothed or lobed with 4-6 sharply acute, antrorse or slightly recurving teeth or lobes per side, sometimes 3(–5)-lobed, midportion generally oblanceolate, midstem 13–25 mm x 5–10 mm, relatively evenly distributed, basal usually deciduous by flowering, petiolar region 2–6 mm, sparsely hirsute, glandular. **Fruiting spikes** 1–2(–3) from distal branches, congested with overlapping flowers and fruits, 2–8 cm; floral bracts linear-lanceolate to narrowly ovate-lanceolate, 3.5–5 mm, usually to twice longer than the calyces, spreading at right angles; rachis glandular. **Calyces** 2.8–3 mm, strigose-hirsute to hirsute-hirsutulous, stipitate-glandular, lobes deltate, mucronate, erect, subconnivent. **Corollas** blue to purple, tubes 3.5–3.8 mm, 0.3–0.5 mm longer than calyces, limbs 1.5–2.5 mm in diam. **Nutlets** easily separating at maturity, 1.5–1.8 mm, commissural faces ending below the nutlet tips, low-papillate.

Flowering (Jul–)Aug–Oct. Pine and oak woods; 2000–2700 m; Mexico (Durango).

Additional collections. **Mexico**. Durango. El Salto, encino, 9 Jul 1982, *Hernandez 7770* (ARIZ); [or] west of Durango, pino, encino, 2000 m, 22 Jul 1982, *Hernandez 8143* (ARIZ); pine covered mountain top, 17 mi W of El Salto, 12 Aug 1956, *Waterfall 12703* (OKLA digital image!, MICH fide Moldenke 1965); open pine woods, 6 mi SW of El Salto, 14 Aug 1959, *Waterfall 15504* (OKLA digital image!).

Greene (1888) noted in the protologue that *Verbena subuligera* was "Near *V. bracteosa* [= *V. bracteata*], with which it agrees well in habit; but the nutlets in that familiar species are a line long and have a sharply rugose back, and a commissure fully coextensive with the nutlet" [vs. nutlets "only faintly striate on the back, the scabrous commissure occupying about four-fifths the length of the nutlet"]. Perry (1933) included the species in her treatment, essentially repeating the contrasts by Greene, and Perry was quoted by Moldenke (1965). O'Leary et al. (2010) have treated *V. subuligera* as a synonym of *V. bracteata*.

When I first saw the MO isotype of *Verbena subuligera*, and having seen only that specimen, I thought it might be a rarely formed hybrid, perhaps between *V. bracteata* and some other species, but after seeing other isotypes and three independent collections (as cited above) of very similar plants from the same area, their morphological consistency and geographical coherence indicate that *V. subuligera* is a distinctive species, albeit apparently a narrow endemic. Among the sheets that I have studied first-hand and those examined from digital images, at least 8 plants appear to be represented among the four separate gatherings.

Verbena bracteata is not a member of the *V. neomexicana* group. Its eglandular vestiture, distinctly petiolate, incised leaves, and nutlets with commissural faces extending completely to the tip are similar to those of *V. xutha* Lehm. (Nesom 2010a). Major differences between *V. subuligera* and *V. bracteata* are presented in the contrasts below.

1. Stems erect to ascending-erect, sometimes decumbent-ascending at the base; stems hirsute and hirsutulous; stems, leaves, rachises, and calyces stipitate-glandular; leaves narrower in outline, mostly oblanceolate, without a distinctly defined petiolar region; floral bracts linear-lanceolate to narrowly

ovate-lanceolate, weakly accrescent or not at all, 3.5–5 mm long; commissural faces ending below the nutlet tips ..... **Verbena subuligera**
1. Stems prostrate or procumbent to decumbent-ascending; stems sparsely hirsute to villous; stems, leaves, rachises, and calyces eglandular; leaves broader in outline, obovate to oblong-obovate or oblanceolate, usually with an abruptly delimited petiolar region; floral bracts lanceolate to elliptic-lanceolate, strongly accrescent, (5–)6–15 mm long; commisural faces extending to very tip of nutlets ..... **Verbena bracteata**

13. VERBENA XYLOPODA (Perry) Nesom, comb. et stat. nov. **Map 11**. *Verbena neomexicana* var. *xylopoda* Perry, Ann. Missouri Bot. Gard. 20: 297. 1933. **TYPE: USA. Arizona**. Pima Co.: Santa Catalina Mts., Sabino Canyon, rocky slopes, infrequent, 21 Apr 1922, *H.C. Hanson A1130* (holotype: MO!, digital image!).

Perennial herbs, taprooted. **Stems** 1–5(–10) from the base, erect to ascending-erect, 20–55(–70) cm, moderately to densely hispidulous to hispidulous or hirsutulous with short, narrowly triangular to linear-triangular eglandular hairs and sparsely sessile- or subsessile- to short-stipitate-glandular. **Leaves** largest and often persistent basally and proximally, mostly ovate to subspatulate, obovate, or oblanceolate in outline, pinnatifid to deely pinnately toothed with 3–4 lobes or teeth per side, sometimes strongly 3–5-lobed, midregion oblanceolate and broadening distally (cf. *V. neomexicana*), basal and lower cauline blades (1–)2–5(–7) cm x 5–15(–25) mm, petiolar regions 5–15(–20) mm, veins impressed adaxially, margins narrowly revolute, distal cauline usually becoming narrower, often linear and entire to toothed, hispidulous and hirsutulous and short-glandular on both surfaces. **Fruiting spikes** 1 or 2–5 from mostly proximal to medial branches, 4–20(–27) cm, elongate and loose with non-overlapping to slightly overlapping fruits; rachises hispidulous and densely stipitate-glandular; floral bracts ovate-lanceolate to narrowly triangular, 3–4 mm, shorter than or equal the calyces; rachis hispidulous to hispidulous-hirsutulous, stipitate-glandular. **Calyces** 2.5–3.5(–4) mm, hispidulous to hirsutulous, subsessile- to short-stipitate-glandular, lobes lanceolate to narrowly triangular, loose, erect, subconnivent or not at all. **Corollas** blue to violet, tubes 4–5 mm, 1–2(–2.5) mm longer than calyx, limbs 4–7(–8) mm in diam. **Nutlets** 1.6–2.2 mm, commissural faces not reaching the nutlet apex, densely bullate, outer surface reticulate.

Flowering (Mar–)Apr–Oct. Rocky slopes, crevices, roadsides, grassland, oak-grassland, desert scrub, mesquite-cholla, ash-sycamore-cottonwood, juniper, juniper-agave-yucca, oak, pine-oak, pine woodlands; (800–)1000–1700(–2200) m; Ariz., N.Mex.; Mexico (Chihuahua, Sonora).

Verbena xylopoda is distinctive among its close relatives in its (a) stem vestiture—the hispid to hispidulous covering of short, stiffly spreading hairs like a bed of glassy tack points, (b) leaf distribution and morphology—mostly basal and proximal cauline, these often deciduous by flower and fruit, pinnatifid to deeply pinnately toothed, the cauline becoming linear and much smaller, and (c) medium-sized flowers. Especially in Chihuahua, the basal and lower cauline leaves usually have been shed by flower and fruit (when most collections are made), with the inconspicuous cauline leaves remaining persistent, giving the whole plant essentially a leafless appearance.

The population system in Chihuahua might justifiably be recognized as a distinct taxon. The cauline hairs are reduced in size to such an extent that the stems can be characterized as hispidulous-scabrous with greatly foreshortened, non-glandular hairs.

Additional specimens examined. **USA. ARIZONA. Cochise Co.**: Chiricahua Mts, Rucker Valley, stony slope, 6100 ft, 8 Sep 1941, *Barneby 5151* (NY); 19 mi NE of Douglas, desert grassland, 4000 ft, 17 Apr 1940, *Benson 10299* (ARIZ); Chiricahua Mts, Chiricahua Mine, 6000 ft, 21 Oct 1907, *Blumer 1804* (ARIZ, MO, NY); 7 mi W of Chiricahua, steep rocky slope, 5000 ft, 6 Sep 1944, *Darrow et al. 1322* (ARIZ); jct Dragoon-Johnson road with Benson-Willcox hwy, rocky limestone

slopes, 4500 ft, 26 Jul 1943, *Darrow s.n.* (ARIZ); S end of Chiricahua Mts, Coronado Natl. Forest, Tex Canyon drainage, oak and pinyon, 16 May 1985, *Fletcher 8062* (UNM); 11 km W of Hwy 80 on Rucker Canyon Road, foot of earth/rock talus slope along dry draw, 1650 m, 21 Apr 1976, *Garton 16883* (ARIZ); Huachuca Mts, head of Sycamore Gulch, overgrazed land, 12 Apr 1950, *Goodding 90-50* (ARIZ); Huachuca Mts, Roh Canon, 6 Aug 1909, *Goodding 334* (ARIZ, NY); Huachuca Mts, Ash Canyon, dry slope, 7 Oct 1961, *Goodding 417-61* (ARIZ); Swiss Elm Mts., Jun 1907, *Goodding 2246* (MO, SMU); 6 mi NW of Chiricahua, grasslands, 18 May 1945, *Gould & Pultz 3164* (ARIZ, NY); Swisshelm Mts, Leslie Canyon, desert grassland, 4500 ft, 5 May 1992, *Johnson 1-92* (ARIZ); Chiricahua Mts, Dos Cabesas, 28 May 1881, *Lemmon 219* (ARIZ); Chiricahua Mts, Hospital Canyon, N of Paradise, 3 Jul 1959, *McCormick 941A* (ARIZ); Huachuca Mts, Lower Ash Canyon, ca. 0.5 mi W of Hwy 92, creek bank beneath oaks, ca. 5150 ft, 19 May 1979, *McFarland 160* (ARIZ); Chiricahua Mts,White Tail Canyon, near hilltop, *Quercus*, *Arctostaphylos*, 2 May 1935, *Maguire et al. 1328* (ARIZ); Bisbee, 3 Oct 1892, *Mearns 1013* (NY); Chiricahua Natl. Monument , S-facing rocky slopes N of Stafford Cabin Area, grassland-shrub, 5400 ft, 13 Jul 1975, *Reeves R3428* (NY); Fort Huachuca, ENE of Kino Spring,1.2 mi NNE of the mouth of Blacktail Canyon, oak, 1520 m, 28 Jul 1992, *Schulz & Krohn 2322* (ARIZ); Swisshelm Mts, Leslie Creek Canyon, bottom of slope below roadside monument, near USGS gauging station, under *Fraxinus* and *Salix*, ca. 4200 ft, 8 Jun 1980, *Toolin 783* (ARIZ); Whetstone Mts, Middle Canyon, 22 Sep 1976, *Van Devender & Martin s.n.* (ARIZ); Huachuca Mts, S-facing slope of Ash Canyon, near intersection with Lutz Canyon, 5820 ft, 13 Jul 1973, *Wentworth 1061* (NY); Chiricahua Mts., White Trail Canyon, gravelly slope, under *Quercus* and *Arctostaphylos*, 2 May 1935, *Wiegand et al. 11065* (MO, NY-2 sheets). **Gila Co.**: Tonto Natural Bridge, rock crevices, upper slopes of canyon, 19 May 1935, *Nelson 2018* (MO, NY); 10 mi W of Payson, hillside, pinyon-oak and scattered yellow pine, 4500 ft, 13 Aug 1946, *Parker 6121* (ARIZ); Salt River, rocky slopes, 26 May 1935, *Whitehead 1288* (NY); 5 mi N of El Capitan, gravelly slopes, W exposure under *Quercus* and *Rhus*, 13 May 1935, *Wiegand et al. 11336* (NY-2 sheets). **Maricopa Co.**: Papago Indian Reservation, W Papago, stream banks, 2400 ft, Apr 1937, *Albee s.n.* (UNM); Sand Tank Mts, Goldwater Air Force Range, Bender Spring, 3500 ft, 11 Oct 1995, *Felger 95-437* (ARIZ); Sonoran Desert Natl. Monument, Sand Tank Mts., 730 meters (air) NW of Bender Spring, summit of small peak, 3490 ft, 17 Apr 2001, *Felger 01-371* (ARIZ); Sonoran Desert Natl. Monument, Table Top Mt., summit mesa 4280 ft, beneath *Condalia* among boulders, 17 Jan 2002 [past flr and frt], *Felger 02-52* (ARIZ). **Pima Co.**: Santa Catalina Mts, Pepper Sauce Canyon, 16 Apr 1937, 4500 ft, *Arnold s.n.* (ARIZ, NY); Rincon Peak, Rincon Mts, Posta Quemada Canyon, 20 km SE of the edge of Tucson, 2.5 km WSW of Papago Spring, flood plain of narrow valley, desert scrub, 3620 ft, 17 Apr 2007, *Baker 16509* (ARIZ); Rincon Mts, along the Turkey Creek trail, limestone slope, oak-pine woodland, 4700 ft, 17 Apr 1983, *Bowers R1094* (ARIZ); Rincon Mts, Posta Quemada Canyon, limestone slopes in desert scrub, 3800 ft, 23 Apr 1983, *Bowers R1114* (ARIZ); Organ Pipe Cactus Natl. Monument, Ajo Mts, rocky slopes along Bull Pasture Trail, with *Agave* and *Simmondsia*, 3000 ft, 9 May 1979, *Bowers 1704* (ARIZ); unnamed canyon at N end of Sikort Chuapo Mts, ca 2 mi S of Coffeepot Mt., with *Simmondsia chinensis*, *Cercidium microphyllum*, *Larrea divaricata*, *Lycium* sp., 2700 ft, 22 Apr 1981, *Butterwick 7407* (TEX); Mt. Lemmon road, vicinity of Control Road, live oak, lower pine belt, 6500 ft, *Carter s.n.* (SMU); Organ Pipe Cactus Natl. Monument, Ajo Mts, Bull Pasture, 2315 ft, rocky, shallow soil, 9 Apr 2005, *Felger 05-177* (ARIZ); Organ Pipe Cactus Natl. Monument, Ajo Mts, Bull Pasture, vicinity of weather station, 3170 ft, 10 Apr 2005, *Felger 05-220* (ARIZ); Santa Catalina Mts, Sabino Canyon, rocky sopes, 21 Apr 1922, *Hanson 1130* (NY); Baboquivari Mts, 26 Sep 1927, *Harrison 4778* (ARIZ); Vail, 28 Apr 1966, *Hesselberg s.n.* (ARIZ); SW corner of the Rincon Mts, Posta Quemada Canyon, just below Colossal Cave, 3550 ft, sandy wash bottom, 16 Apr 1973, *Holmgren 6810* (NY); Santa Catalina Mts, Sabino Canyon, 27 Sep 1934, *Kearney & Peebles 10355* (ARIZ); Ajo Mts, Canyon Diablo, 21 Mar 1935, *Kearney & Peebles 10846* (ARIZ); north end of Santa Rita Mts, limestone area, 4800 ft, 26 Jul 1976, *McLaughlin 1130* (ARIZ); northern Santa Rita Mts, limestone bajada, shaded bank of wash, 3900 ft, 5 Apr 1986, *McLaughlin 3304* (ARIZ); Buenos Aires Natl Wildlife Refuge, dense grove of *Salix*

gooddingii along San Luis Wash, 3630 ft, 27 May 1988, *McLaughlin 4649* (ARIZ); 4.9 mi NW of Arivaca, lower slopes of San Luis Mts S of Arivaca Creek, with *Opuntia* and mesquite, 3700 ft, 6 Aug 1988, *McLaughlin 4847* (ARIZ); Helvetia, 4200 ft, 9 Aug 1959, *Martin s.n.* (ARIZ); Santa Rita Mts, vic. of Helvetia, grassland with *Mortonia*, *Fouquieria*, *Agave*, 4000 ft, 9 Sep 1982, *Mittleman 359* (ARIZ); Organ Pipe Cactus Natl. Monument, Ajo Mts, Alamo Canyon, 4 May 1939, *Nichol s.n.* (ARIZ); Santa Catalina Mts, Pepper Sauce Canyon, 6 May 1925, *Nichol s.n.* (ARIZ); Organ Pipe Cactus Natl. Monument, Ajo Mts, S side of Arch Canyon, ca. 3500 ft, 28 Mar 1965, *Niles 551* (ARIZ); Baboquivari Mts, Toros Canyon, 28 Mar 1927, *Peebles et al. 3790* (ARIZ); Baboquivari Mts, Fresnal, 11 Jul 1931, *Peebles 7928* (ARIZ); foothills of the Santa Rita Mountains, 11 May 1884, *Pringle s.n.* (NY-2 sheets); Saguaro Natl. Monument, canyon near Sweetwater Trail, limestone bedrock, 3500 ft, 7 Mar 1989, *Rondeau 89-54* (ARIZ); Altar Valley, 21 Mar 1906, *Spalding s.n.* (ARIZ); Fresnal, 6 Apr 1928, *Thackery 42* (SMU); Rozemont, 10 Sep 1915, *Thornber 8111* (ARIZ); Total Wreck Mts, 7 May 1902, *Thornber s.n.* (ARIZ); Saguaro Natl. Monument, King Canyon, gravel in shady canyon bottom, 3100 ft, 29 Mar 1989, *Van Devender 89-102* (ARIZ); Tucson Mts, Saguaro Natl. Monument, Sweetwater Canyon, stream bottom, 2960 ft, 27 Mar 1993, *Van Devender 93-531* (ARIZ). **Pinal Co.**: 15 mi up Aravaipa Canyon from San Pedro Junction, loam soil along stream, 3400 ft, *Populus* and *Juglans*, 22 Apr 1936, *Anderson 1044* (ARIZ); Sonoran Desert Natl Monument, Table Top Mt., grassy saddle and lower slopes of "northern" peak N of trail terminus, upper desert scrub with *Yucca*, *Canotia*, *Pleuraphis*, 4 Apr 2001, *Felger 01-304* (ARIZ); hills above Rosemont, 13 Mar-23 Apr 1903, *Griffiths 4122* (MO); Devil's Canyon above Superior, 28 Mar 1926, *Harrison & Kearney 1488* (ARIZ); Oracle, 20 Apr 1930, *Harrison & Kearney 6689* (NY); 8.1 mi S of Oracle on road to Mt. Lemmon , rocky outcrop with *Fouquieria*, 27 Apr 1973, *Lehto et al. 11033* (NY); 5 mi N of Oracle, along San Pedro River, gravelly W slopes, mesquite and cholla, 20 Apr 1935, *Maguire 10884* (MO, NY-2 sheets); Oracle, 27 May 1973, *Neff 41* (TEX); Santa Catalina Mts, Oracle Road, above road 6.5 mi below turnoff, open slope in grassland, 11 Oct 1962, *Niering & Whittaker s.n.* (ARIZ); Gila River bottom near Sacaton, 30 Apr 1926, *Peebles et al. 1753* (ARIZ); Sacaton Diversion Dam, river bottom, 14 Apr 1926, *Peebles & Harrison 1649* (ARIZ); Sycamore Canyon, upper fork of Virgus Canyon, 8 mi W of Aravaipa Creek, oak woodland, 4800 ft,12 May 1980, *Warren & Anderson 300* (ARIZ); Santa Catalina Mts, Bonito Canyon, ca. 6 mi SSE of Oracle, oak woodland, 4900 ft, 5 May 1979, *Van Devender s.n.* (ARIZ). **Santa Cruz Co.**: Coronado Natl. Forest, Rock Corral Springs, ca. 5.6 km W of I-19 on Rd 4145, *Prosopis-Quercus*, 19 Apr 1995, *Annable 2390* (ARIZ, NY); Fresno Canyon, side drainage E of wash, juniper, 1130 m, 1 Sep 2000, *McLaughlin 8478* (ARIZ); Canelo Hills, Monkey Spring, 4650 ft, pockets on travertine dike, 9 May 1966, *Niles 759* (ARIZ); Ted Knipe property, ca 3 mi W of Sonoita on Rte 82, N end of Canelo Hills, scattered oaks, 4500 ft, 22 Aug 1974, *Reeves R1131* (NY); N side of limestone hill above Papago Springs Cave, 29 Sep 1979, *Toolin 494* (ARIZ). **Yavapai Co.**: Antelope Creek in the Weaver Mts., occasional along creek in riparian, 3800 ft, 6 Apr 1980, *Butterwick & Hillyard 5982* (ARIZ); along jeep trail to Beehive Mine, southern Weaver Mts., 3600 ft, chaparral-desert scrub, oak-*Yucca*-*Ceanothus*, 1 Jun 1980, *Butterwick & Hillyard 6683* (ARIZ); Rio Verde, Fort Whipple, rocky hills, 8 Sep 1865, *Cones & Palmer 577* (MO); ca. ½ mi E of Jerome, rocky slope, 4500 ft, 14 Apr 1960, *Crosswhite 718* (NY); 1 mi S of entrance to 6Bar Ranch on road between Seven Springs and Bloody Basin, steep chaparral-covered slope, 27 Apr 1974, *Engard et al. 202* (NY); hills on E side of Black Mts, W of Hy 93, NW facing slope, *Cercidium*, *Opuntia*, 2950 ft, *Fischer 6291* (ARIZ); 6 mi NW of Date, open rocky slopes, 3800 ft, 9 Apr 1947, *Gould & Darrow 4180* (ARIZ); 4.7 mi S of Bloody Basin Road, along Seven Springs Rd , N of Magazine Mesa, ca. 3000 ft, chaparral, locally common in rocky wash, 21 Apr 1984, *Hodgson 2832* (NY); Hillside-Congress road, 3.2 mi S of Hillside, 3800 ft, shrubby hillside, 6 May 1973, *Holmgren 7122* (NY); Skull Valley, 4300 ft, 28 Apr 1903, *Jones s.n.* (MO); Copper Basin, 11 Apr 1910, *Lewis 956* (LL). **County unknown**: without locality, 1891, *MacDougal 634* (TEX). **New Mexico**. **Hidalgo Co.**: Guadalupe Canyon, 15 mi E of jct with road to Douglas, Arizona, very SW corner of the state, *Juniper-Agave-Yucca* zone, dry sandy slope, 4200 ft, 20 Apr 1968, *Hess 1735* (ARIZ, SMU); Guadalupe Canyon, ca. 25 mi E of Douglas, Ariz., dry

hillsides above *Fraxinus-Platanus-Populus* bottomland, rocky areas on slope, 4200 ft, 17 Aug 1971, *Hess 2790* (SMU). **MEXICO. CHIHUAHUA**. 20 mi S of Parral on Hwy 45, open rocky hillsides in oak-grassland, 5900 ft, 28 Jul 1975, *Engard 639* (LL); Mpio. Chihuahua: Rancho La Campana, potreros del plan, 1540 m, pastizal mediano abierto, *Gonzalez E. 855* (TEX); La Campana Experimental Ranch, near Encinillas, 1 Aug 1957, *Knobloch 252* (LL); Encinillas, Hwy 45, 2 Oct 1958, *Jones 23255* (TEX); ca. 50 mi NW from Chihuahua, roadside, 6 Jul 1946, *Lee 46* (NY, TEX); SW of Chihuahua, 1 Aug 1936, *LeSueur 875* (TEX); W of Buenaventura along Hwy 28, 7.4 mi W of jct Hwy 10 in Buenaventura, ravine slope into seasonal spring below road, *Quercus*, 2000 m, 29 Aug 1989, *Mayfield 106* (ARIZ, TEX); 6.4 mi W of jct Hwy 28 with Hwy 10 on Hwy 28 W of Buenaventura, disturbed soil of roadside, 1850 m, 29 Aug 1989, *Mayfield 126* (TEX); vicinity of Chihuahua, ca. 1300 m, 8-27 Apr 1908, *Palmer 52* (NY); vicinity of Chihuahua, ca. 1300 m, 5-10 Jun 1908, *Palmer 360* (MO); Hwy 45, ca 18 mi N of Chihuahua, N side of small mountain range on brownish igneous rock outcrop, overgrazed arid grassland with *Mimosa*, 29 Apr 1985, *Spellenberg et al. 8131* (BRIT, NY); 2 mi up gravel road from Parral-Santa Barbara hwy ca. 2-3 mi W of Parral, 18 Aug 1967, *Stuessy 1013* (NY, TEX); 12.6 mi S of Gallego along Hwy 45, rocky soils, *Mimosa*, 5300 ft, 18 Jul 1975, *Wallace et al. 197* (LL, MO). **SONORA**. Valle de Teras, region of the Rio de Bavispe, [just E of La Angostura], grassland, 28 Aug 1940, *Phillips 753* (ARIZ, LL); 45 km E of Agua Prieta, Rancho Puerta Blanca, 9 Apr 2005, *Roulston SBV141551* (TEX); Fronteras, Jun 1854, *Thurber 446* (NY); NE of Sierra Anibacachi, Rancho La Calera, ca 10 km (by air) SW of Agua Prieta, isolated hill, Chihuahuan desert scrub on limestone, 1287 m, 17 Aug 2007, *Van Devender 2007-842* (TEX); 6 mi E of Agua Prieta, road to Colonia Morelos, region of the Rio de Bavispe, 3900 ft, 7 Aug 1941, *White 3836* (ARIZ, NY); 5 mi N of Fronteras, Hacienda de San Rafael, region of the Rio de Bavispe, mesquite-grassland, 3800 ft, 9-12 Aug 1941, *White 3882* (ARIZ).

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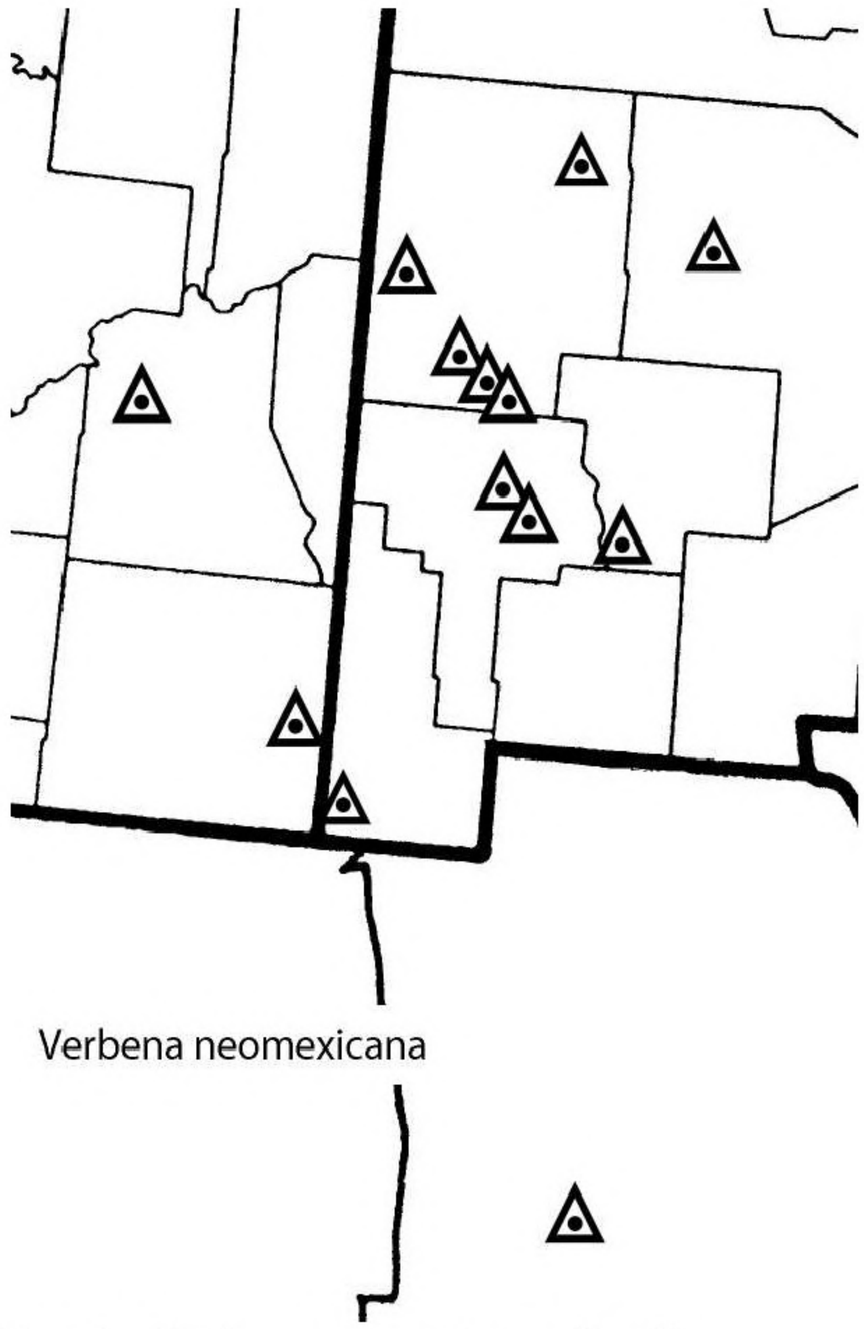
Figure 1. Holotype of *Verbena calinfera* Nesom (*Moran 21749*, LL).

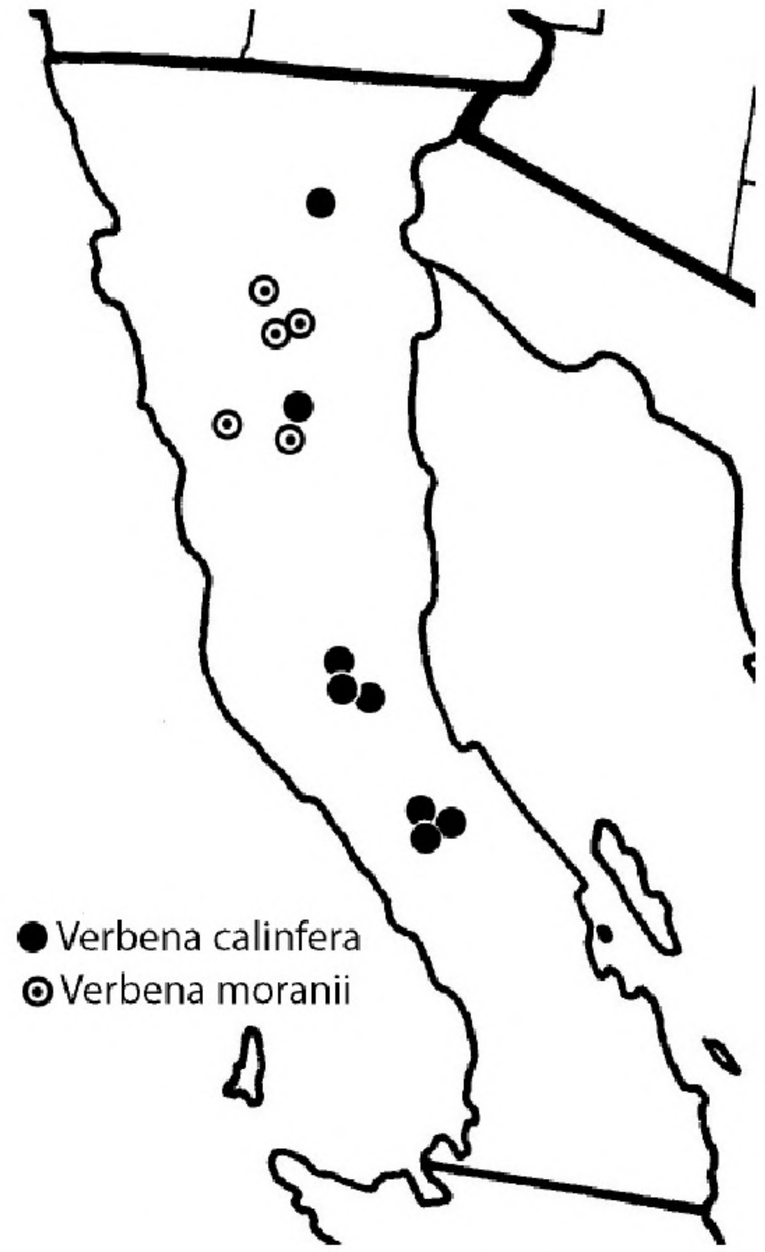
Figure 2. Holotype of *Verbena falcata* Nesom (*Hinton 28113*, MEXU).

Figure 3. Holotype of *Verbena livermorensis* Turner & Nesom (*Palmer 30791*, TEX). .

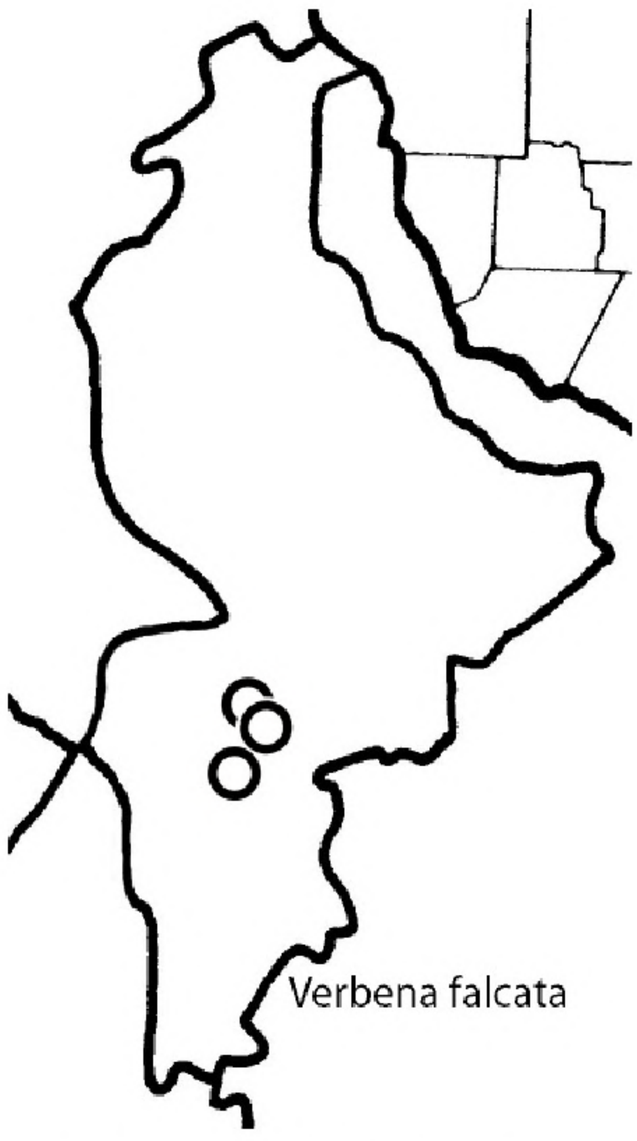
Figure 4. Holotype of *Verbena moranii* Nesom (*Moran 24936*, LL). .



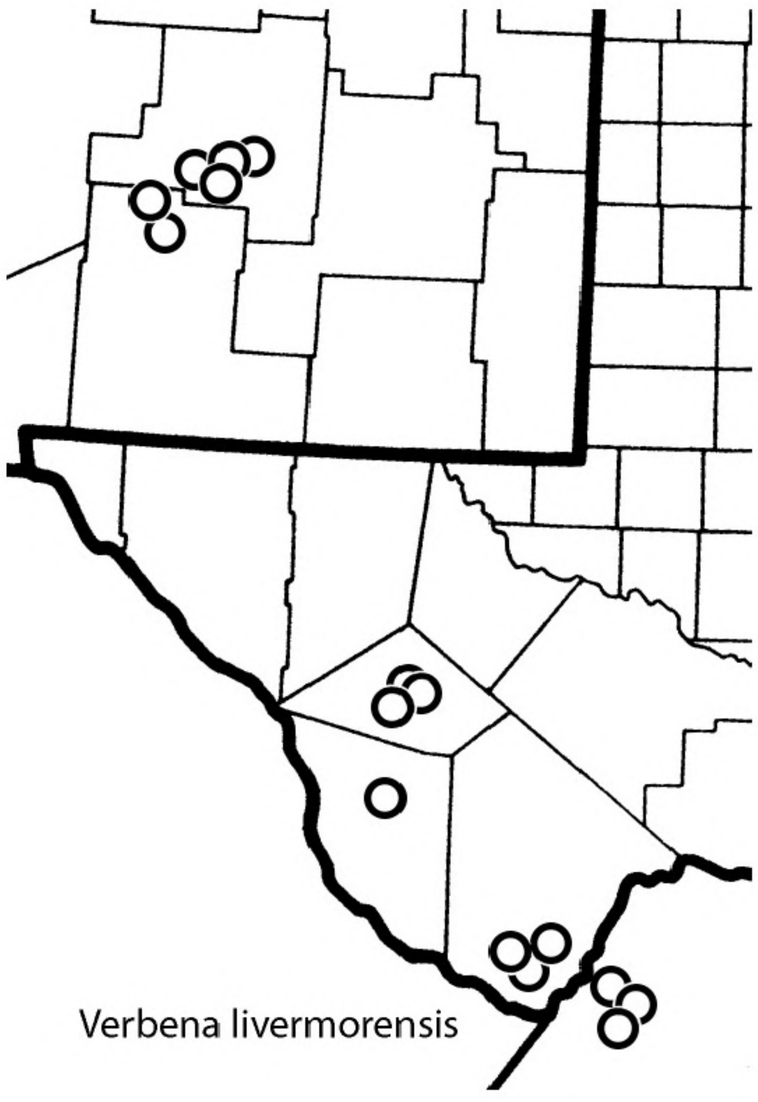
Map 1. *Verbena neomexicana* Small.



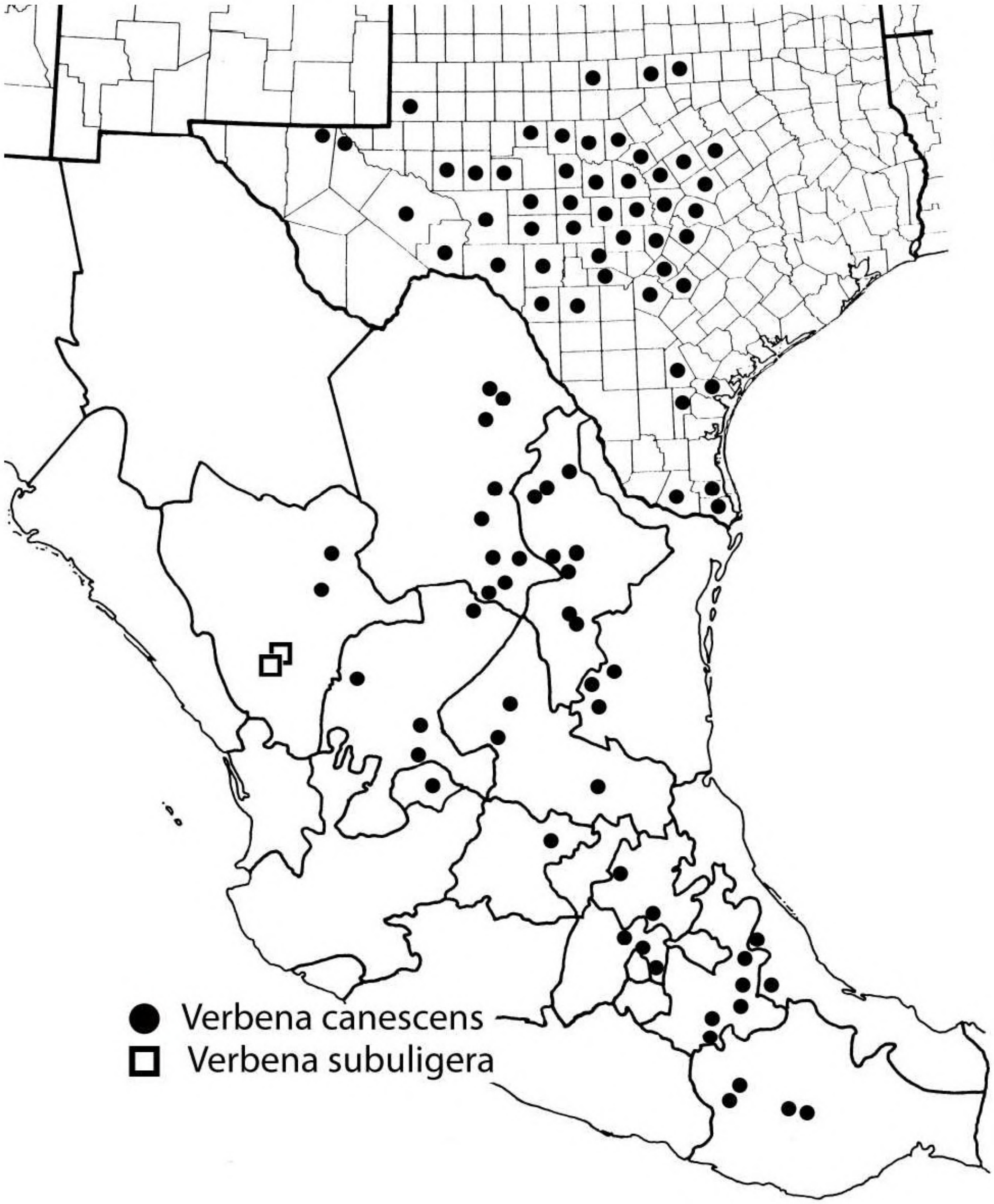
Map 2. *Verbena calinfera* Nesom and *Verbena moranii* Nesom.



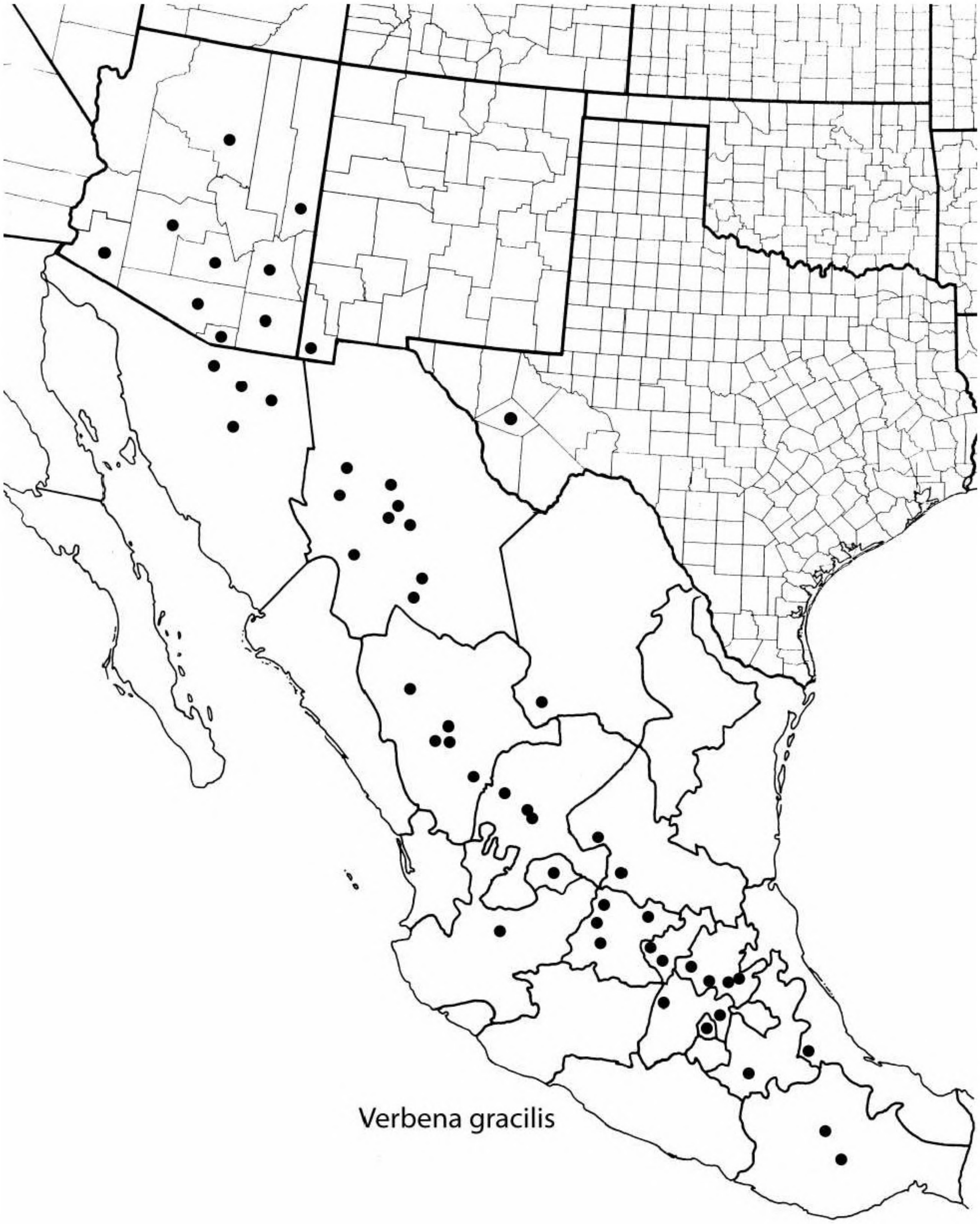
Map 3. *Verbena falcata* Nesom



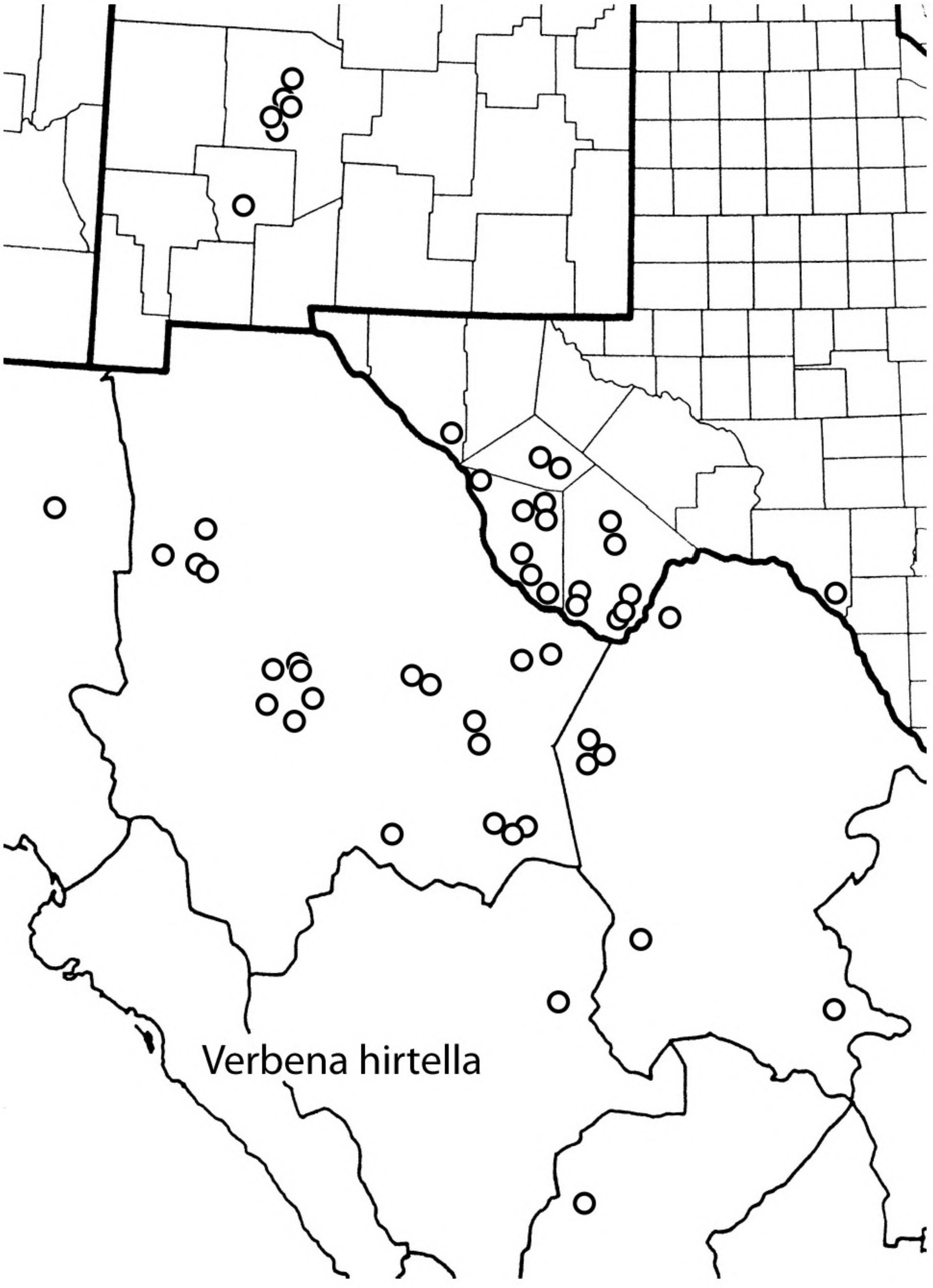
Map 4. *Verbena livermorensis* Turner & Nesom.



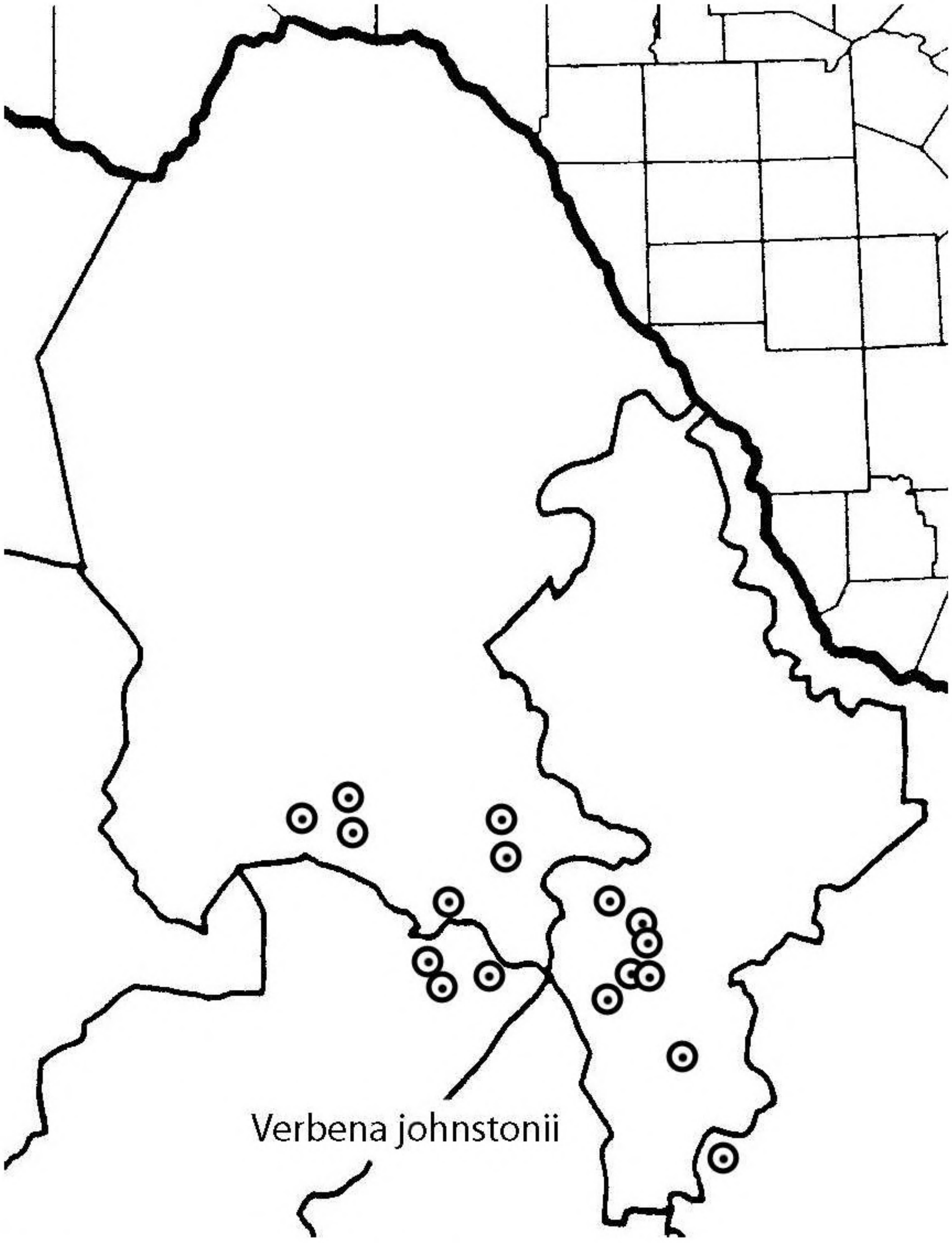
Map 5. *Verbena canescens* Kunth and *Verbena subuligera* Greene.



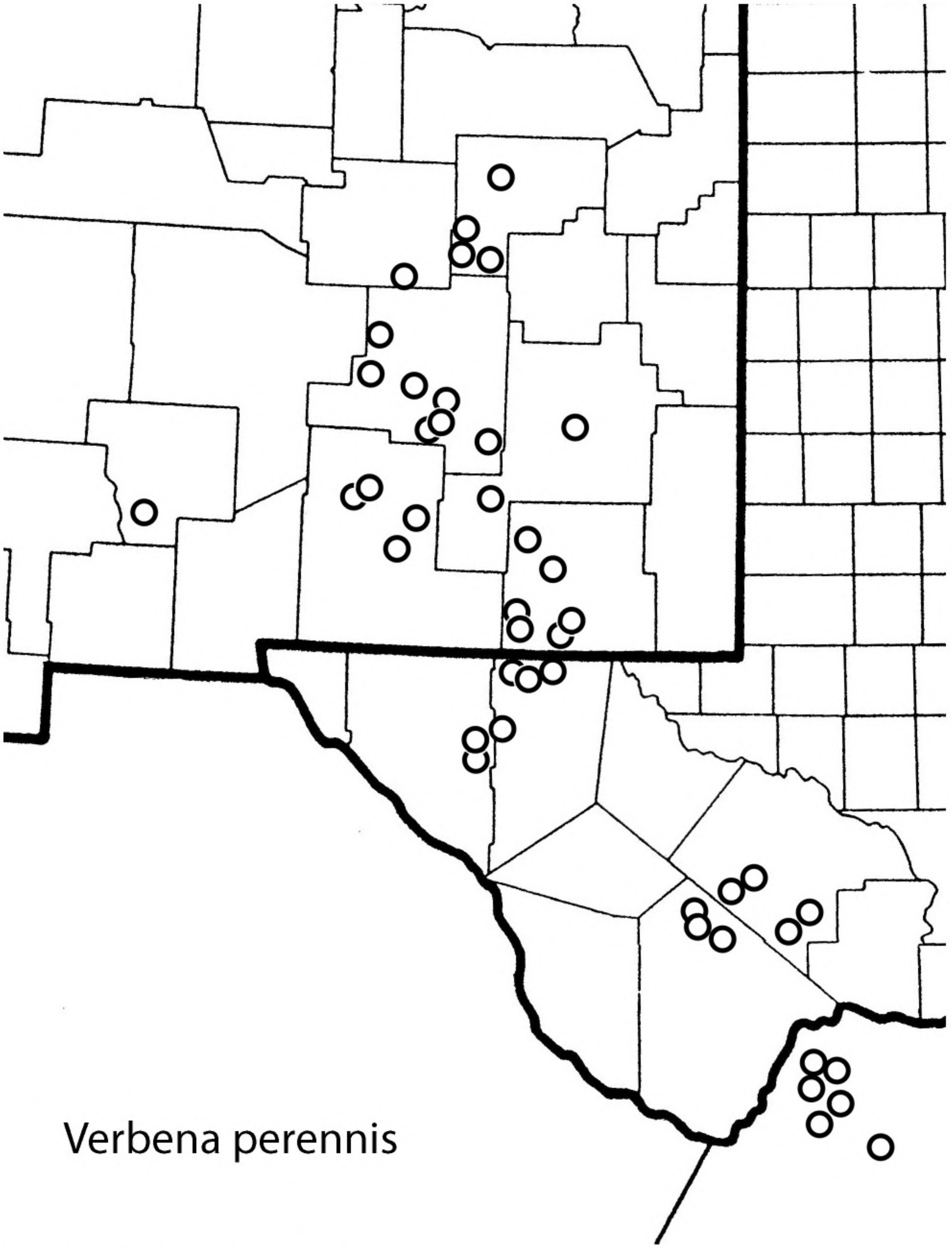
Map 6. *Verbena gracilis* Kunth.



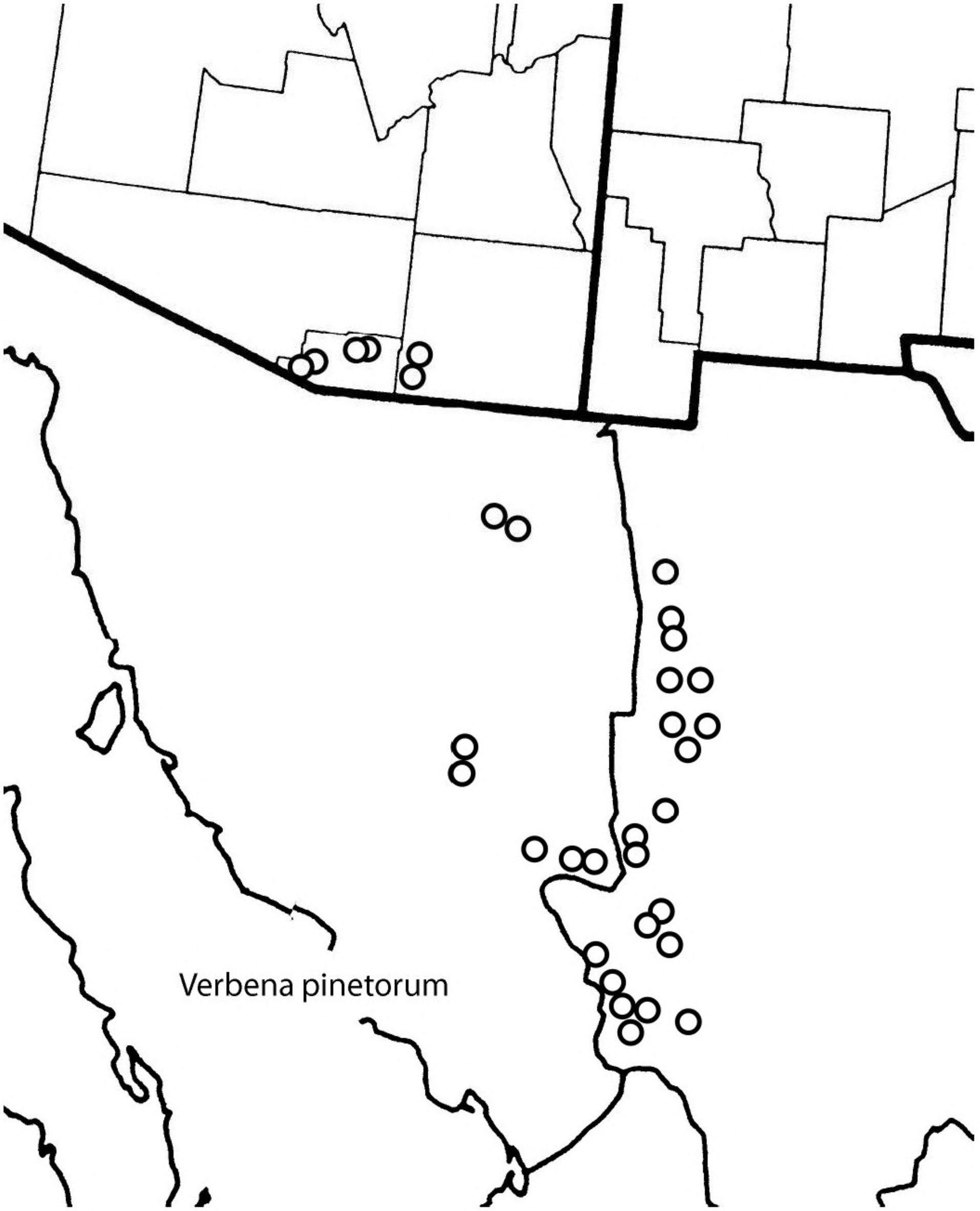
Map 7. *Verbena hirtella* (Perry) Nesom.



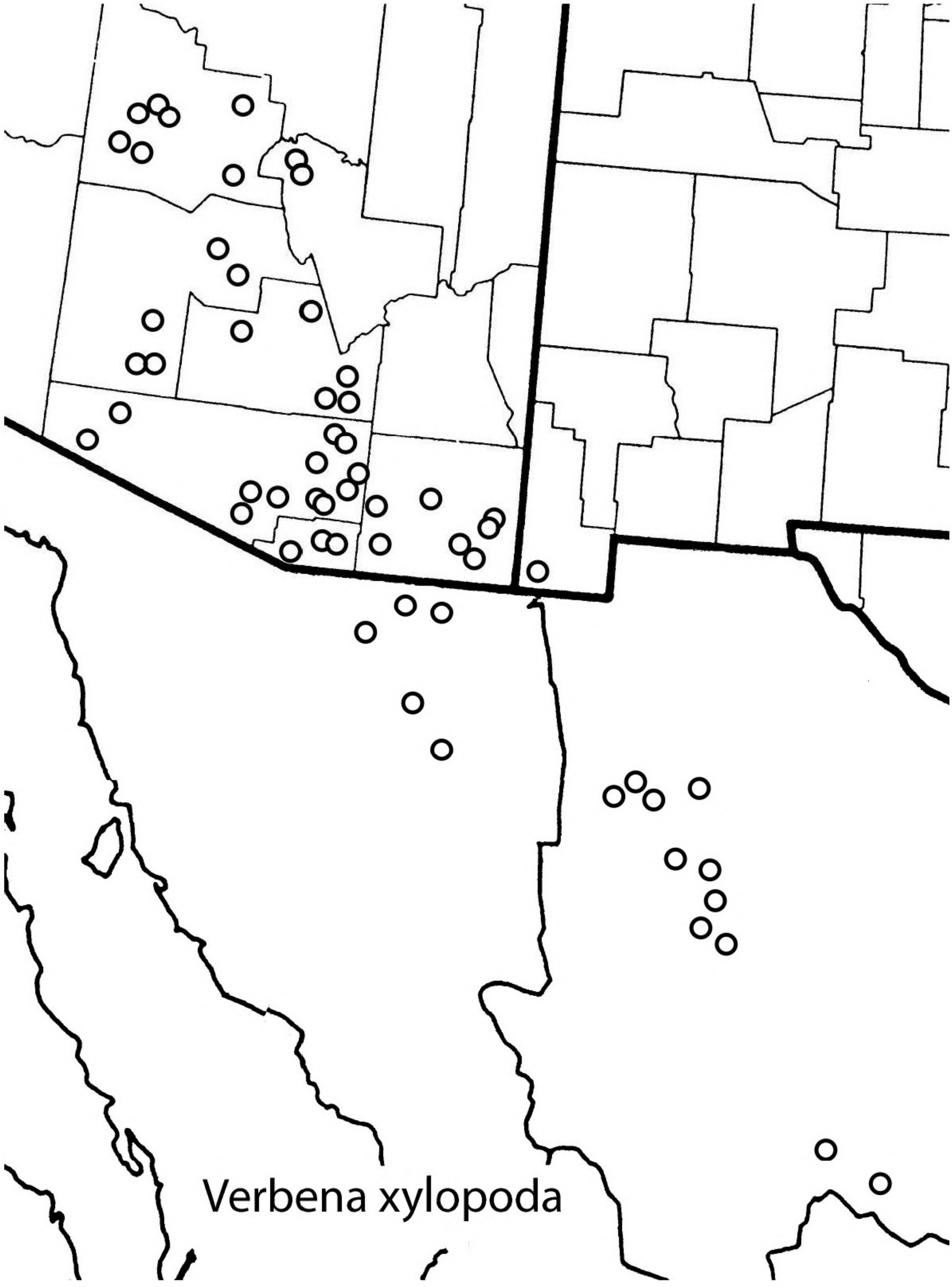
Map 8. *Verbena johnstonii* (Moldenke) Nesom.



Map 9. *Verbena. perennis* Wooton.



Map 10. *Verbena pinetorum* Moldenke



Map 11. *Verbena xylopoda* (Perry) Nesom.